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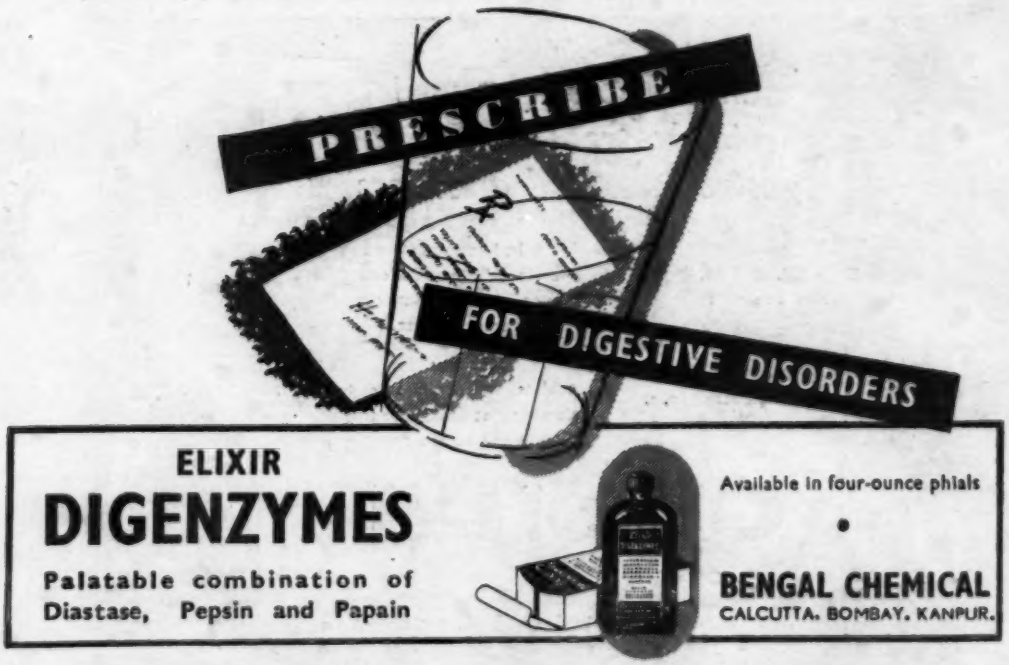

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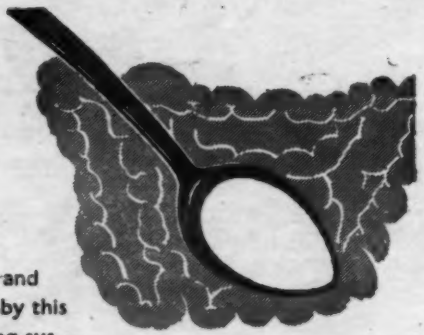

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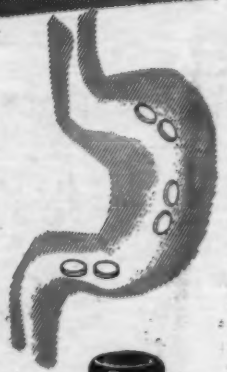

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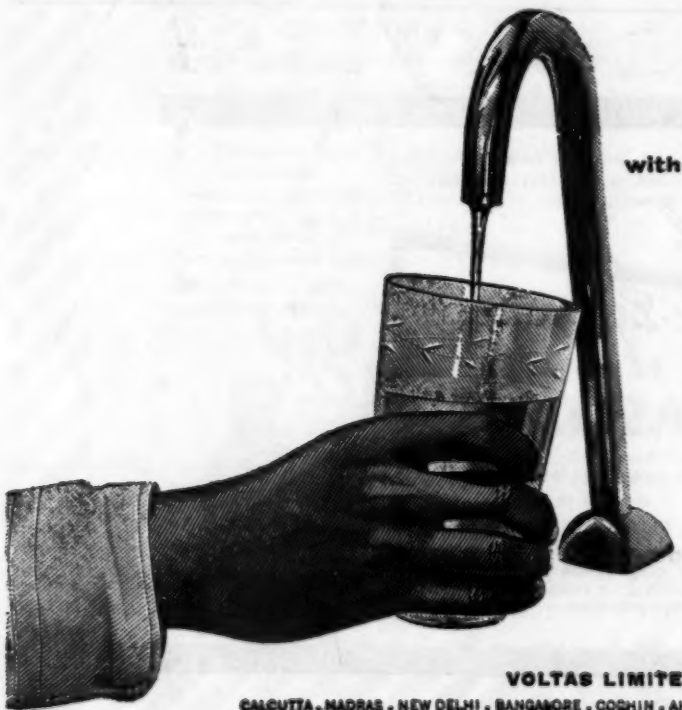

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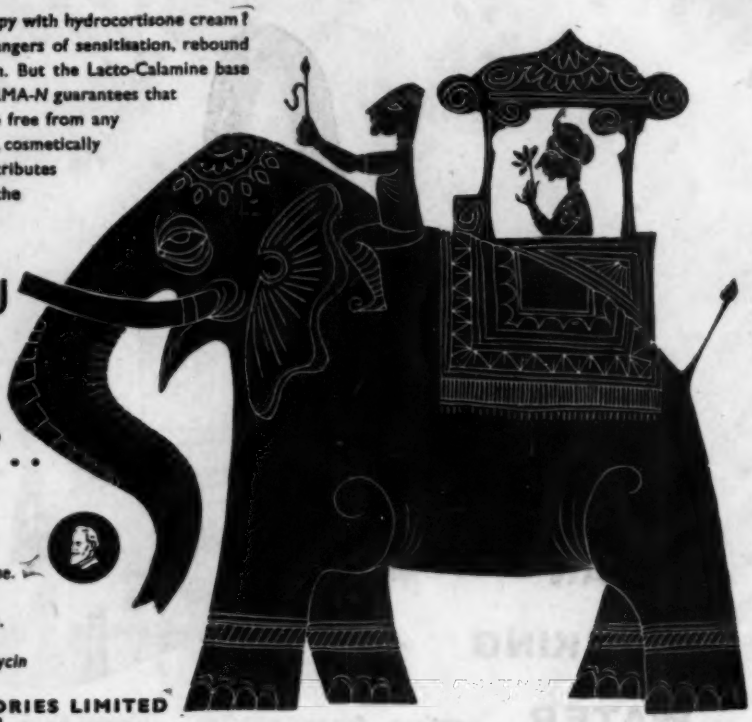

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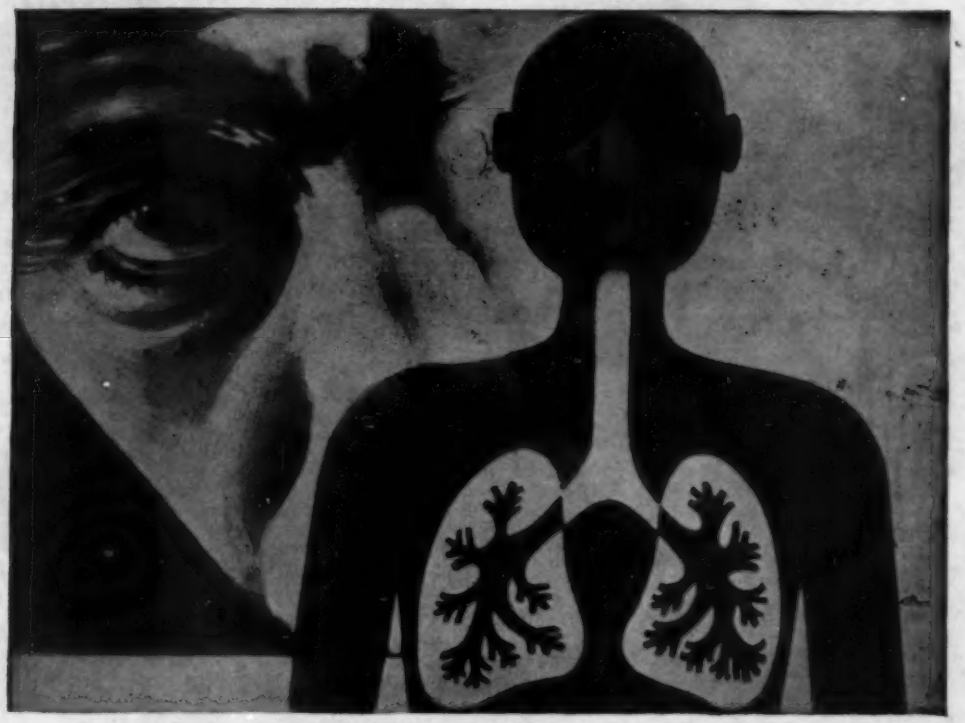

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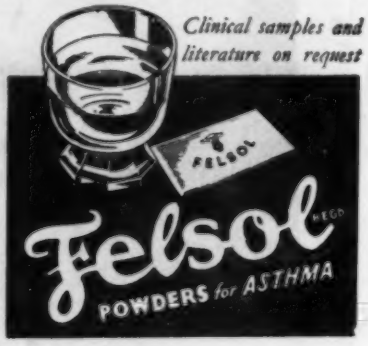

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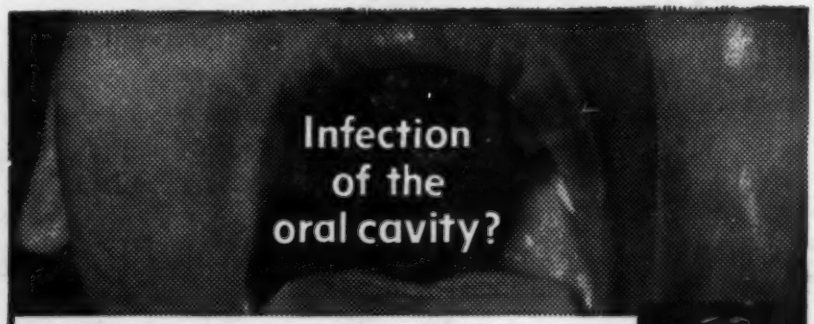

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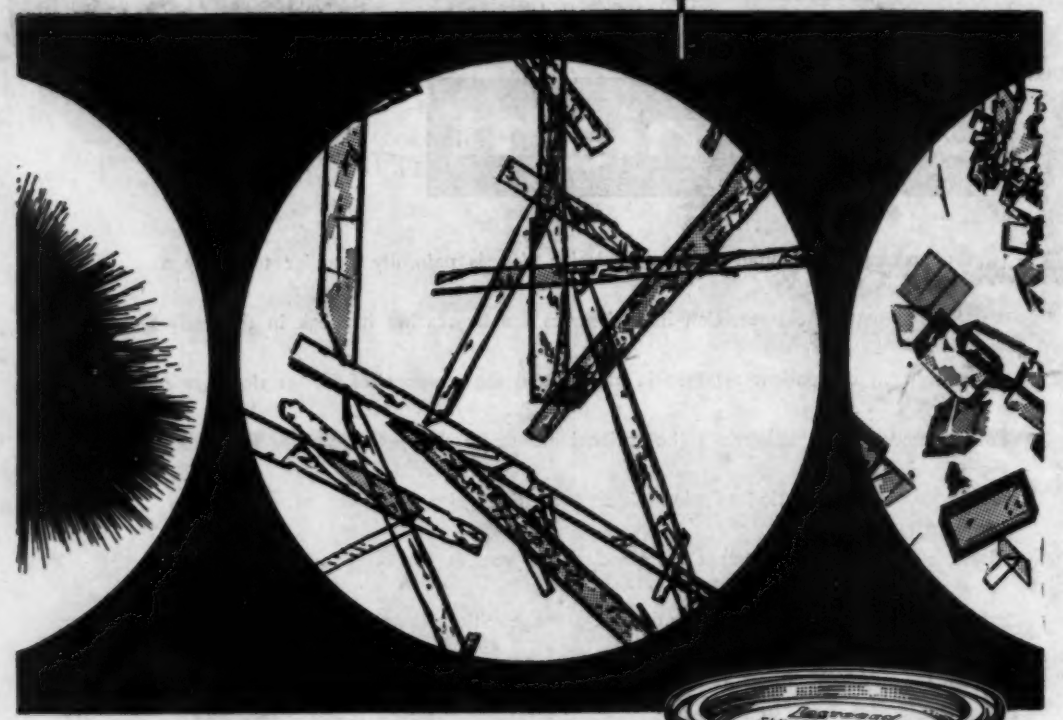

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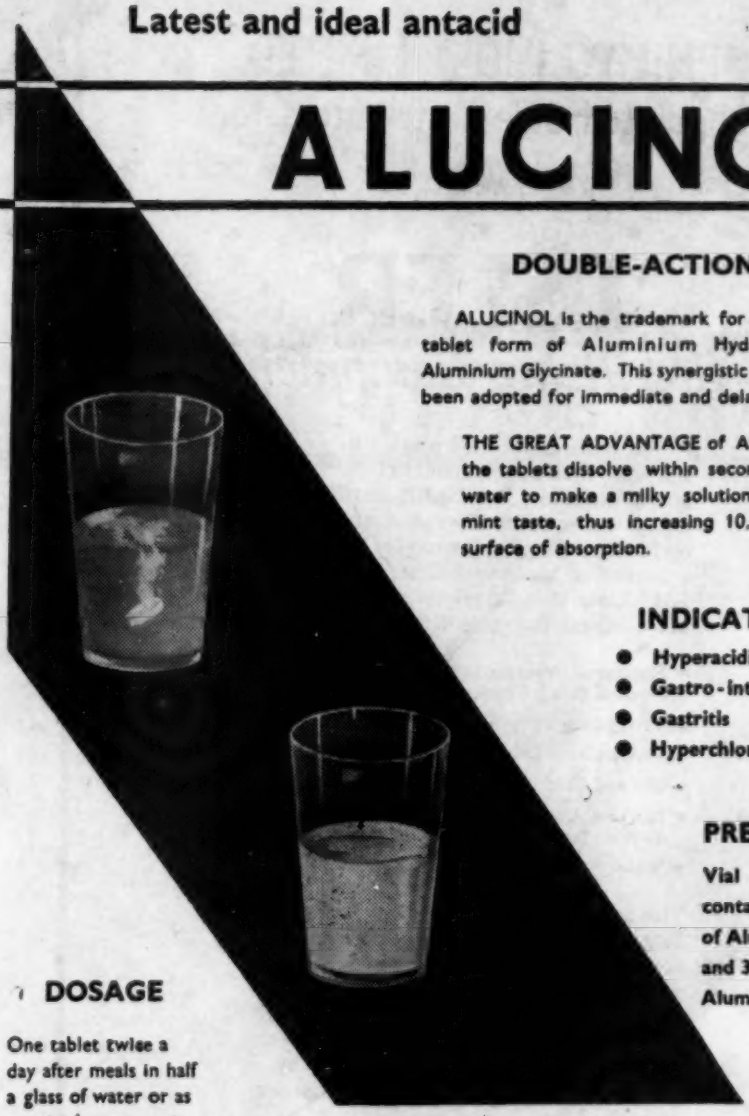

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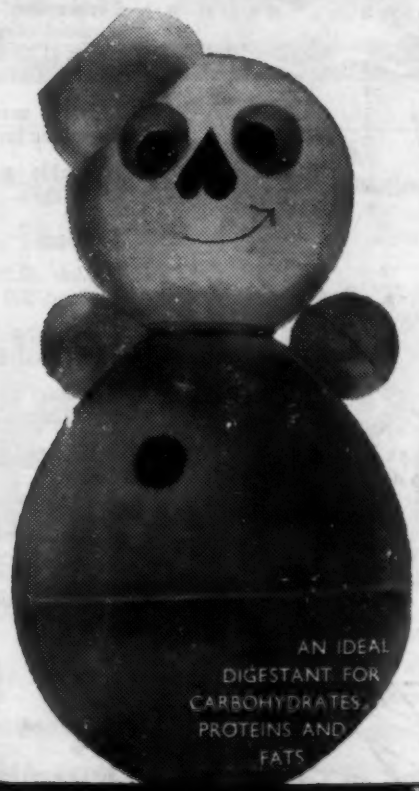

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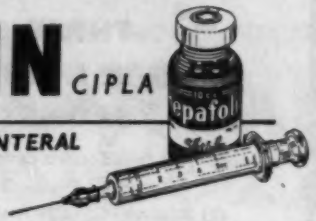

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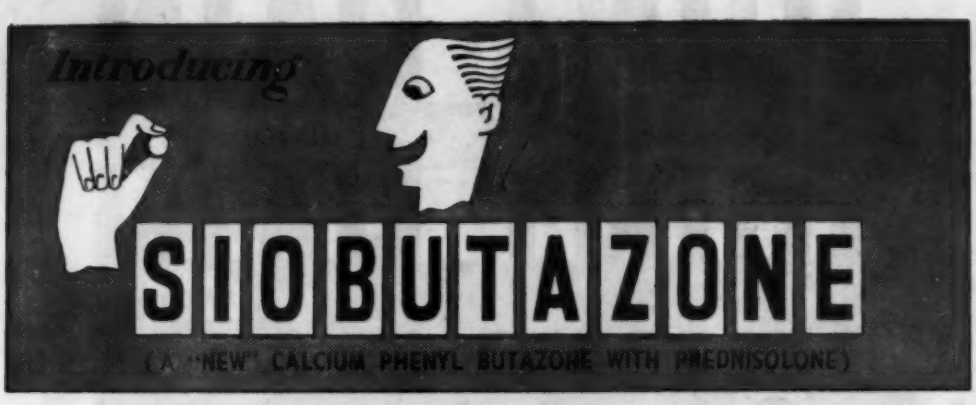

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ORIGINAL ARTICLES

TETANUS IN VILLAGES OF THE PUNJAB: AN EPIDEMIOLOGIC STUDY*

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Tetanus is recognised as an important disease in all regions where the prevailing agricultural economy depends on animals. India is primarily an agricultural country; 82·7 per cent of the population is rural. Mechanisation in cultivation of the land is making progress; an occasional tractor appears in the villages, simple machines such as choppers for animal fodder are common, and motor power is increasingly used for irrigation pumps and other purposes. The main reliance is still on hand labour and bullocks. Under these conditions tetanus would be expected to be relatively frequent. The extent of this health problem is not well quantitated for the more isolated villages of India where incidence presumably is the greatest.

A field study of population dynamics in a rural area of the Punjab (Gordon and Wyon, 1960) over a four-year period was of necessity especially concerned with deaths—their number, nature and cause. Tetanus was demonstrated as an important cause of death (Gordon, Singh and Wyon, 1961), particularly of the newborn. This report is concerned with those cases; it has the further characteristic that it deals with deaths in relation to the populations in which they occurred; it is an epidemiological study. It contrasts to the commoner clinical investigation where deaths are related to the number of patients in a prescribed series.

All deaths in the study area were investigated by a physician, whether or not the patient had been under medical care. Recognition of cause of death was by clinical and epidemiological evidence, measures that suffice acceptably for a disease as definite as tetanus. Populations at risk were determined by annual census. No recoveries from the disease are known to have occurred in this experience, so that the frequency of death is likewise the measure of morbidity. Only 3 patients of the series were under the care of a physician, none of them infants who account for most of the cases.

PRESENT DAY TETANUS

Tetanus in cities of the West declined sharply as the motor car replaced animal drawn transport. Agriculture also has undergone mechanisation in high degree, with the result that the incidence of the disease is now low in Europe and North America (Axnick and Alexander, 1957). Tetanus of the newborn has become most uncommon as births increasingly are in hospitals rather than homes. Along with this has come a general shift in age distribution from children to adults. Fatality continues high because of the nature of the disease and because deaths at advanced ages, past 50 years, are excessive. Tetanus remains primarily a disease of the male. In industrialised

* This study was supported in part by the Rockefeller Foundation of New York, the Government of India and the Indian Council of Medical Research.

regions such as Connecticut (Rindge, 1960) in the United States, the present tendency is for the greater incidence to shift from the less populated to the more heavily populated areas, although tetanus is still more rural than urban.

In military practice tetanus has changed from one of the scourges of warfare to an inconsequential curiosity. During four years of World War II, only 12 cases of tetanus and 5 deaths occurred in the American army with a strength at its height that exceeded ten million men (Gordon, 1958). The shift from passive immunisation with tetanus antitoxin to active protection with tetanus toxoid accounts for the difference (Long, 1955), at the same time providing the pattern for a better control of the disease under civilian conditions.

From a world standpoint, the tetanus of today is a problem of tropical rural areas (Editorial, 1958-59), not because the disease has any climatic predilections but because the environmental conditions favour its propagation, particularly an animal economy. Among native patients in goverment hospitals of Kenya (Rigby, 1960) in 1957 tetanus was the fifth leading cause of death with 258 fatalities. Tetanus neonatorum was the main consideration. In Thailand (Stahlie, 1960) where 85 per cent of deliveries are by untrained midwives, an investigation of 37 neonatal deaths showed 14 to be due to that disease. If deaths with suggestive symptoms, including convulsions, are added the proportion is 51 per cent.

The fatality of tetanus neonatorum has always been high. A 1930 review (Hines Jr., 1930) of 5767 deaths includes a collected series of 27 instances of recovery. In many parts of the world conditions have not changed greatly, even with improved methods of treatment (Dietrich, 1951 ; Gelfand, 1955 ; Klenerman and Scragg, 1955) and better medical care (Spivey *et al*, 1953) ; in West Nigeria, Jelliffe (1950) reports one recovery among 25 cases, and in a larger series of 141 patients (Tompkins, 1958) the case fatality was 90 per cent. A comparable rate of 83 per cent has characterised recent experience in Venezuela (Castillo and Salom Gil, 1959), and rather universally, in the Congo (Lambotte-Legrand, 1950), in Algeria (Thiodet *et al*, 1956) and in Haiti (Earle and Mellon, 1958), although some small groups of cases have ended in 60 per cent recoveries as in Haiti (Symonds, 1960). Death is usually prompt, within the first week or ten days of life and after a brief illness. Recovery after a month has been recorded (Thiodet *et al*, 1956), and death has occurred after a clinical course of 42 days (Jelliffe, 1950). Fatality is greatest when the incubation period is short, 1 to 5 days, as contrasted to 10 days or so, as noted in an analysis of 1047 cases in Sao Paulo, Brasil (Pinheiro, 1957).

Tetanus in the Punjab

The present field study shows tetanus to be among the ten leading causes of death in Punjab villages. Its significance is not reflected in officially recorded causes of death because reporting is not by medical certification (Gordon *et al*, 1961). Seemingly the disease is also underestimated in medical centres of the region, mainly because tetanus is less frequent in cities than in the countryside, because its acute and incapacitating nature limits the number of villages able to go to medical centres for treatment, but mainly because most of the patients are newborn infants not commonly hospitalised. Tetanus is recognised as a general medical problem in India. In King Edward Memorial Hospital, Bombay, 2007 cases were admitted between November 1954 and October 1958 : a special tetanus ward is maintained (Patel *et al*, 1960).

The disease is well known among village people, as it occurs in adults and in infants. Tetanus neonatorum is characterised as "like the disease grown-up persons get after they are hurt and get attacks of stiffness of the body and cannot open the mouth and die." Death registers of villages have the frequent entry of *athrah* or 'Eighth disease', recognised as invariably fatal, with death occurring on the eighth day of life and accompanied by convulsions. Interpretation of this disease takes varied directions and amplifications but this is the one usually advanced. An intriguing circumstance is that when tetanus of the newborn was a common disease in the Western Isles of Scotland in the 19th century, it also was known as 'Eight Day Fever'.

Case reports illustrating typical behaviour of the disease in newborn infants and its less common occurrence in adults, are given below :

Case Reports

Case 1—A male infant, the son of a farmer, and the 6th child of the family, died of an acute illness on the sixth day of life. Delivery was at full term by an untrained local midwife, uneventfully. The cord was said to have been cut by scissors, but with no certainty as to whose scissors; the attendant "could not swear". The baby was large and unusually healthy, so much so as to suggest an older infant. The child nursed well and passed normal stools and urine. The first sign of illness was 36 hours before death; the infant refused the breast and became "stiff as a board". Convulsions developed promptly, and soon recurred every few minutes. The body would become stiff, the colour blue and the mouth fixed. In the intervals between attacks

the arms and legs were flexed, the hands clenched and the colour improved. There was no fever, vomiting or diarrhoea. Treatment consisted of a suppository for constipation prescribed by the village medicine man, not a physician, and the burning in the room by the local saint of a substance stated to have medicinal properties.

Case 2—A village shopkeeper, aged 44 years, had a fall from his bicycle in a village street, suffered a minor abrasion of the leg, stated to be "no more than a scratch" and thought no more about it. Twenty days later, after no intervening indisposition, his jaw became locked and his neck stiff. The next day he had tonic and clonic convulsions, recurring at frequent intervals. A physician was called from the nearest city; he made a diagnosis of tetanus and administered 100,000 units of tetanus antitoxin intravenously. The patient received a second similar dose on the third day, but with no clinical improvement. He maintained full consciousness and fever was low grade. On the sixth day of illness he was removed to a hospital, 26 miles away, and died after 24 hours.

Case 3—A woman, aged 31 years, wife of a sweeper and mother of 5 children, was in the third month of pregnancy. She attempted an abortion by some kind of powder, nature unknown, taken by mouth; and by inserting a stick wrapped in cotton into the cervix uteri where it remained for 24 hours. Eleven days later an excessive haemorrhage occurred by vagina with expulsion of indefinite matter, presumably the foetus. Bleeding ceased within 24 hours but a slight pinkish discharge continued. She was first seen by a physician four days after the haemorrhage. At that time she was weak and anaemic, the temperature was 99·6°F and the pulse rate 110. She developed trismus the day before; stiffness of the neck and shoulder muscles appeared during the night, and presently she complained of some chilliness. She was having repeated convulsions at intervals of about 20 minutes. The clinical diagnosis was of tetanus and she was admitted to hospital the next day. She died on the seventh day of illness.

Case 4—A 31 year old woman, wife of a barber, had an acutely developing illness. The chief complaint was inability to open the jaws; there was no associated local pain or swelling. The patient had low grade fever, the extent unknown, and she was thirsty. The next day respirations were increased and difficult, a condition that persisted; and convulsions developed. She was removed to a hospital, 12 miles distant, where she received an injection of tetanus antitoxin, which was repeated the next day. Her condition became progressively worse and she died on the fourth day of illness. No evidence of an external wound could be detected, nor was a history of injury to be had.

Tetanus in these Punjab villages is primarily a problem of infants. Of 33 deaths from tetanus during the years 1957, 1958 and 1959 in this population of about 12,000 in eleven villages, 30 were of newborn infants. Case reports have been given of the adults who died of tetanus, one after a minor injury, one as the result of an attempted abortion and the other with no history or evidence of injury, presumably following an unrecognized wound and sometimes denoted as idiopathic tetanus.

An arresting observation in these studies was the chance occurrence of two unrelated deaths from tetanus of different origin in members of the same family. A father (Case 2), contracted tetanus as the result of a street accident two years after the death of his infant son from tetanus neonatorum acquired during home delivery. Repeated cases of tetanus neonatorum in the same family are of course no uncommon event in numerous countries of the world. A recent report from North Africa records several such instances; in one family in the course of years 4 of 6 newborn infants died of this disease (Föllmer, 1960).

The Punjab series of 33 deaths included 24 males and 9 females. Tetanus of adults is recognised universally as a disease predominantly of men, mainly because they have a greater risk of traumatic injury. Why tetanus neonatorum should prevail in males to the extent that it did, 23 males and 7 females, has no clear explanation. No ritual or other procedure peculiar to male births was identified. The series is small and yet the differences are so great as to fall outside chance probability. The sex distribution of 1402 births during the time of these studies was 719 males and 683 females.

Deaths from tetanus were more numerous in the dry colder months of winter than during the hot summer of April to October, respectively 20 and 13, but with no clear evidence of a seasonal prevalence. The disease was noted in all months of the year and the distribution by years was essentially even. None of the eleven villages in the study area escaped a death from tetanus during the 3-year period of observation; even the smallest community of 278 persons had one death.

Disease specific death rates for tetanus averaged 90·4 per 100,000 population per year. No demonstrable differences existed between the several villages; the number of deaths was in general accord with the population.

Occupation and caste appeared to have little relation to frequency of the disease. More cases occurred in the families of farmers than of leather workers or persons of other occupations and interests, but there were more farmers. Village housing has the common characteristic of animals being sheltered in the residential compound and housed usually in a part of the same building or even in the same room used by the family. Floors of the living quarters are commonly of hard pack-

ed earth mixed with cow dung, and the walls are of similar construction; these are regularly plastered with the same mixture to keep them clean, neat and water resistant. Cow dung mixed with earth and straw is the common fuel, prepared by the women. Fertiliser for the fields is from the same source. The epidemiology of tetanus depends on the ability of the infectious agent to form spores and thus survive environmental and disinfective measures destroying most other bacteria. The wonder is not of the amount of tetanus but of how little there is.

Causative Factors

Since most cases of tetanus in this experience were of the newborn, the search for causative factors naturally turned to practices associated with childbirth. Attendance at delivery almost without exception is by midwives. There are 27 in the 11 villages. Two are nurse midwives, well trained and competent; four others have had short courses of instruction. The remainder are schooled by experience and usually illiterate; every village had one or more such practitioners and in 5 villages they were all who were available.

The untrained midwife has a kit of sorts but the common custom is that the family provides the means for cutting the umbilical cord. Thus, sickles used in the fields sometimes serve in farmer families, or the cutting instruments of leather workers, or household scissors or knives, some scoured with ashes before use. The usual dressing for the wound is with ashes from cow-dung fires, having some elements of sterility but scarcely certain. There are the usual sanitary hazards incident to the environment and the limitations of the attendant. In Haiti according to Earle and Mellon (1958) the untrained midwife cuts the cord with anything handy and ties it with a piece of string or wire; charcoal mixed with dust is applied to the cut stump which is wrapped in leaves or a handy piece of cloth. Friedlander (1951) in describing practices among the Bantu in South Arica tells of the various unclean instruments used to cut the cord, such as old razor blades or pieces of glass, and dressings that range from rags to rat dung.

The full significance of tetanus in village populations of the Punjab is seen in its position among recognised causes of death in the general population. In these studies tetanus ranked fourth (Gordon *et al*, 1961) although in most countries it is a disease rarely appearing on lists of the 10 leading causes of death. Thirty of the 103 neonatal deaths during the study period were due to tetanus. Similar studies should be made in other representative parts of India. The suggestion is for greater attention to this condition in current programmes for a better public health in rural regions.

Preventive Measures

Control of tetanus in the villages need not await the long-term improvement that will come from an altered agricultural economy and an improved medical care. Under any circumstance, the attack on deaths from tetanus is preventive rather than therapeutic. A simple course of training for midwives produced remarkable results in Puerto Rico where tetanus of the newborn was once as frequent as in the Indian villages of this study. Provision for such training now exists in the Punjab and in India generally, but to an insufficient degree. Greater use of trained midwives in regional supervision of the untrained ones would seemingly prove fruitful, through education as to methods, equipment and techniques of asepsis. A system of licensing would provide means for control of midwifery practices.

Practical considerations and the limitation of facilities detract from what is the most direct and prompt approach to control (Cohen *et al*, 1951; Trowell and Jelliffe, 1958). Active immunisation with tetanus toxoid has proved its effectiveness in military and civilian practice. The methods are described in the well known manual Control of Communicable Diseases in Man (Gordon, 1960). Immunisation of expectant mothers leads to protection of the newborn infant (Cohen and Scadron, 1946; Fernan-Nunez, 1938; Mathes, 1955; Scheibel, 1955). A workable programme would include immunisation of married women and to advantage a reinforcing or booster dose (Katitch, 1960; Looney *et al*, 1956) at the time of each pregnancy. Primary immunisation in early pregnancy (Freda, 1956) is singularly free of reactions. The results potentially should equal those attained through the system of vaccination against smallpox now in force in these same communities. With added training of the vaccinator, the two programmes conceivably could be combined.

Aside from the prevention of tetanus neonatorum, new work on passive protection with antitoxin in case of injury indicates the need for larger doses than customarily practised (Edsall, 1959), a recommendation (Gordon, 1960) particularly pertinent under village conditions where contamination of wounds is heavy.

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OBSERVATIONS ON THE SECRETION OF BLOOD GROUP SUBSTANCES IN GASTRIC JUICE

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AND

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The significance of the presence of blood group substances in body fluids has not been clearly defined. Duodenal ulcer has been reported to be less common in secretors (Clarke *et al*, 1956 ; Dunn, *et al*, 1956). Neonatal haemolytic anaemia due to ABO incompatibility has been recorded to be more frequent in secretors (Zuelzer and Kaplan, 1954). A high proportion of aberrant secretion has further been found in a group of spontaneous aborters (McNeil *et al*, 1957).

Regarding the relative distribution of blood group substances in different body fluids, the highest concentration is obtainable in the gastric juice (Putkonen, 1930 ; Friedenreich and Hartmann, 1938 ; Roy and Chatterjea, 1958). The amount of blood group substances secreted in gastric juice, however, varies in different subjects. So far only scanty information is available about the bearing of acid secretion on the amount of blood group substance in the gastric juice. Witebsky *et al* (1942) did not find any correlation between the two secretions ; in 12 cases of pernicious anaemia when no free hydrochloric acid or pepsin were present in the gastric juice, the group substance was present in a concentration similar to that in normal. Injection of histamine has been reported to increase the secretion of gastric acidity without affecting the secretion of blood group substances (Osborn, 1952).

In view of the above considerations, it was thought worthwhile to investigate whether variation in acid secretion is in any way related to the secretion of blood group substances.

Materials and Method

The gastric samples were collected from 87 different subjects undergoing fractional gastric analysis test. The subjects were drawn mostly from the patients admitted into the Carmichael Hospital for Tropical Diseases. The patients were allowed to take light diet on the previous night ; the fasting juices and different samples of fractional gastric analysis were collected in the

morning. Fasting samples were examined from all the subjects. In ten subjects, various samples with variable acid concentrations were tested for the amount of group specific substances. In two subjects of achlorhydria, the different samples were collected both before and after histamine injection.

The material after collection was centrifuged at 2,500 r.p.m. for 15 minutes. The clear supernatant fluid was separated out and adjusted to pH 7·2 to 7·4 by the addition of (N/10) NaOH solution, as necessary. The neutralised samples were boiled in boiling water bath for 10 minutes. The amount of secretion of the group substance was determined, by agglutination inhibition technique (Wiener, 1943).

Results

The results of inhibition tests are shown in Table 1.

Table 1—Showing Relation of ABO Substances to Acid Secretion of the Gastric Juice (87 Samples)

Gastric acidity (Unit of acidity)	Number of cases with various inhibition titre				
	2^9	2^{10}	2^{12}	2^{14}	2^{16}
Hypochlorhydria (0-20) ...	1	3	10	5	2
Normal (20-60) ...	2	12	11	11	2
Hyperchlorhydria (60 and above)	—	6	16	3	3

The relation of the titre of blood group substances to the acid secretion in cases of hypochlorhydria, normal and hyperchlorhydria are schematically represented in Figs. 1, 2 and 3 respectively. Effect of histamine injection is shown in Fig. 4.

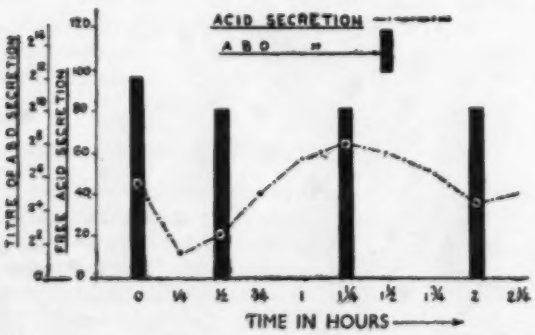

Fig. 1—Showing Relation of Acid Secretion and ABO Secretion (Acid Range=10 to 60)

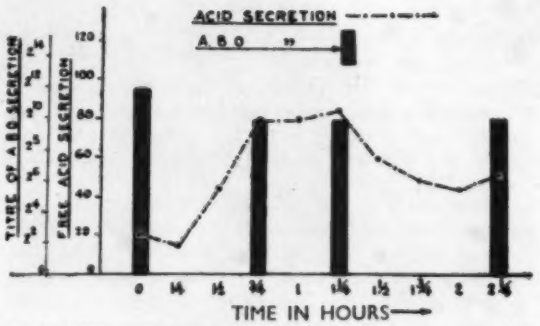

Fig. 2—Showing Relation of Acid Secretion and ABO Secretion (Acid Range=15 to 85)

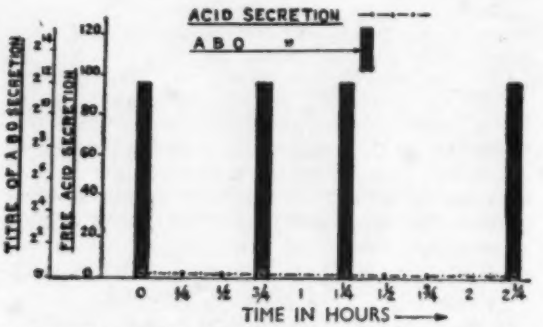

Fig. 3—Showing Relation of Acid Secretion and ABO Secretion (Acid Range=0 to 0)

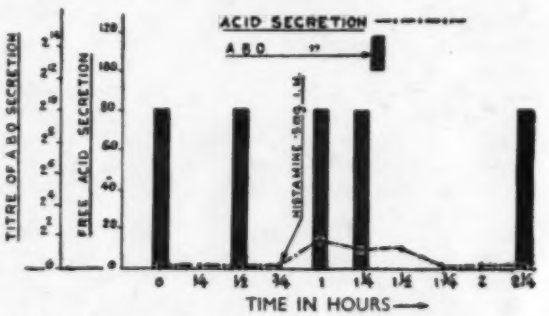

Fig. 4—Showing Effect of Histamine Injection on the Secretion of Acid and ABO Substances. Secretion of Acid is Increased with No Effect on the Secretion of ABO Substances

Statistical Analysis of Data

Relation between secretion titre and acid concentration—The subjects can be grouped into three categories according to the acid concentration, viz., hypochlorhydria (free acid content 0-20), normal (free acid content 20-60) and hyperchlorhydria (free acid above 60).

Since the cell frequencies are very small, the titre values have been grouped into two, viz.,

upto 2^{12} in one group and above 2^{12} in the second group. Table 2 gives the frequency of persons with different titre values and having different acid concentration.

TABLE 2—SHOWING NUMBER OF PERSONS BY TITRE VALUES AND THE DEGREE OF ACID CONCENTRATION

Group	Titre values		No. of cases
	up to 2^{12}	above 2^{12}	
1. Hypochlorhydria (0-20) ...	14 (14·72)	7 (6·28)	21
2. Normal (iso-chlorhydria) (20-60)	25 (26·64)	13 (11·35)	38
3. Hyperchlorhydria (60 and above)	22 (19·64)	6 (8·37)	28

Figures in parentheses indicate the expected frequencies

On the assumption of the independence between the two characters, the titre value and the acid concentration, the expected frequencies have been calculated and presented in Table 2 in parentheses immediately below the observed frequencies in each cell. The observed value x^2 is 1·43 and the number of degrees of freedom is 2. Now the observed value of x^2 is close to the theoretical value of x^2 corresponding to $P=0{\cdot}50(x^2=1{\cdot}386)$ and it can be said that the assumption of independence has not been disproved. Therefore, the present set of data does not indicate that the titre values differ significantly with the acid content.

DISCUSSION

From the analysis of data obtained from an examination of 87 samples of gastric juice, it was observed that the amount of group specific substance secreted was not related to the gastric acid secretion. Similar titres of inhibition were obtained both in cases of hypochlorhydria, isochlorhydria (normal) and hyperchlorhydria.

Though the free hydrochloric acid content varied in different samples of gastric juice as sampled in fractional analysis test, the amount of blood group substance was more or less constant in all the samples. The injection of histamine slightly increased the acid secretion in achlorhydric subjects, but no difference in the titre of blood group substance could be noticed.

The statistical analysis of the data indicates that the titre of secretion of ABO substance is not significantly related to that of acid secretion. Similar results were obtained by Witebsky *et al* (1942) and Osborn (1952).

SUMMARY

Eighty seven samples of gastric juice were examined to find out whether secretion of acid is in any way related to secretion of blood group substance. The titre of secretion of ABO substance had no significant correlation to the acid secretion.

ACKNOWLEDGMENT

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ERRORS IN THE DIAGNOSIS OF TETANUS

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INTRODUCTION

To an experienced doctor who has seen cases of tetanus, accurate diagnosis by differentiating the various conditions which may at the first sight simulate tetanus, is not usually difficult. However, mistakes in diagnosis occur, and tetanus is often wrongly diagnosed as well as missed. This is because a few symptoms are common to tetanus

and other diseases. The incidence of diagnostic errors increass when the examining doctor is in a hurry or is inexperienced, and is common with newly appointed casualty officers in a general hospital.

When tetanus is wrongly diagnosed, usually a trivial condition is mistaken for a more severe one, and the patient is admitted to a hospital where careful examination soon reveals the true state of affairs and apart from the temporary alarm created in the minds of patients and their relatives, no harm is done. Failure to diagnose tetanus is, however, more serious. It is often seen that an early case of tetanus visits an E.N.T. specialist for pain in the throat or a dentist for pain near the teeth, or an orthopaedic surgeon may be consulted for backache or a general surgeon for abdominal pain, the patient ascribing the symptoms to that particular region of his body. When this occurs, the patient attends the respective department for a few days before a well developed picture of tetanus develops, and the opportunity for early therapy is lost. The specialist, not being familiar with cases of tetanus, frequently commits diagnostic errors which often tip off the balance between life and death, because of late institution of therapy. Even in experienced hands mistakes have occurred, and early tetanus has been missed or often wrongly diagnosed. The present paper is a study of such cases.

Material and Methods

Between November 1954 and April 1960, 3,262 cases were diagnosed as tetanus and admitted in the Tetanus Ward of the King Edward VII Memorial Hospital, Bombay. After admission to the ward every patient was examined thoroughly, and it was found that 364 cases were not suffering from tetanus. This accounted for wrong diagnosis of 11·1 per cent of the patients admitted to the Tetanus Ward. Every effort was made to arrive at a proper diagnosis, and the symptoms that led to mistaken diagnosis are carefully analysed here. The presenting symptoms that led to errors in diagnosis are given in Table 1. In addition, 50 cases of tetanus in which the disease was missed were referred from other departments, and their presnting symptoms are given in Table 2.

From a critical analysis of 364 cases with wrong diagnosis (Table 1) it will be seen that trismus, one of the commonest symptoms of tetanus, may be simulated by many other conditions, the commonest of which are hysterical lockjaw and dental causes. Very rarely it may be due to some affection of the joint. 63 cases presented symptoms of dysphagia which led to diagnostic error. Dysphagia is one of the commonest symptoms of tetanus but can also be caused by tonsillitis, pharyngitis, quinsy, and diphtheria. 63 cases of convulsion, one of the most prominent symptoms of tetanus, led to error in diagnosis. But convulsions are caused by so many other conditions, that to base one's diagnosis on convulsions alone would certainly lead to error. It will be seen that hysterical convulsions and convulsions due to meningitis or acute fevers were found to be fairly common that led to diagnostic difficulty. Conversion hysteria which is often due to psychological causes is gradually becoming recognised and should be looked for, and a careful history might

Table 1—Showing Presenting Symptoms in 364 Cases which Led to Diagnostic Error (Other Diseases Diagnosed as Tetanus)

Presenting symptoms (No. of cases)	Correct diagnosis (No. of cases)
Trismus (110) ...	Hysterical lockjaw (51); dental causes, e.g., erupting or impacted molar, alveolar abscess, caries and periodontitis (53); orthopaedic conditions, e.g., fracture of mandible or maxilla and subluxation of temporomandibular joint (4); submucous fibrosis (2)
Dysphagia (63) ...	Tonsillitis (23); pharyngitis (28); quinsy (8); diphtheria (1); dehydration in newborn (2); haemorrhagic disease of newborn (1)
Convulsions (63) ...	Hysterical convulsions (11); purulent meningitis (4); tuberculous meningitis (14); encephalitis (4); mumps encephalitis (1); idiopathic epilepsy (1); febrile convulsions (14); cerebrovascular accidents (4); paraplegia with flexor spasms (3); tetany (7)
Pain in abdomen (9)	Tuberculosis of the abdomen (3); undetermined cause (6)
Fever :	
(i) Backache with fever (33)	Smallpox (2); Pott's disease of spine (1); undetermined cause (30)
(ii) Bodyache with fever (54)	Short fever (30); bronchopneumonia (17); rheumatic fever (6); peripheral neuritis (1)
(iii) Stiffness of neck with fever (30)	Myositis of neck muscles (29); cerebellar abscess (1)
(iv) Pain in chest with fever (2)	Pulmonary tuberculosis (2)

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throw some light. Backache with fever or bodyache with fever accounted for quite a large number of cases that led to mistaken diagnosis. They were mostly due to undetermined causes. Stiffness of the neck due to myositis of the neck muscles accounted for 30 cases of mistaken diagnosis.

In the second group of 50 cases presented in Table 2, the largest number of cases (31) presented pain and stiffness of neck and other parts of the body, and were diagnosed as rheumatism of some part of the body. The number of cases which presented with pain in the throat and dysphagia, and were treated as pharyngitis, was 8. 5 cases had pain in the abdomen. The data are presented under different headings, grouped according to aetiological factors.

TABLE 2—SHOWING TETANUS MISDIAGNOSED AS VARIOUS OTHER DISEASES (MISSED TETANUS)

Presenting symptom	Initial incorrect diagnosis	No. of cases
Pain and stiffness of neck ...	Rheumatism ...	11
Bodyache with fever ...	Short fever ...	7
Stiffness of body and bodyache	Rheumatism ...	4
Stiffness of legs	Rheumatism ...	2
Backache	Lumbago ...	7
Trismus	Hysterical lockjaw	1
	Caries teeth ...	1
Facial paralysis	Bell's palsy, ...	1
	Bilateral facial palsy (cause ?)	1
Pain in chest and fever ...	? ...	1
Dysphagia	Pharyngitis ...	8
Spasm of abdominal muscle (pain)	? ...	5
Retention of urine	? ...	1
Total ...		50

MISDIAGNOSED TETANUS

Hysteria—Hysterical trismus (51) and hysterical convulsion (11) formed 17 per cent of cases mistaken as tetanus. It is surprising that even Price's Textbook of the Practice of Medicine (1956) does not mention this condition in differential diagnosis, which Brain (1956), Cole (1958) and Yodh (1932) have referred to. Hysterical convulsion can easily be diagnosed from an accurate history from the patient's relatives. In hysterical trismus, which closely simulates tetanus, attempts at opening the mouth are resisted without showing risus. So in order to arrive at the correct diagnosis it should be noted that there is risus sardonicus, abdominal rigidity or stiffness of the neck in between the convulsions. Diagnosis of hysterical trismus should be confirmed by history of sudden onset after some emotional episode, other hysterical traits in the patient's personality and the appearance of the patient. However, if in doubt it is always wise to admit the patient for observation and isolation and watch the patient's symptoms to confirm the diagnosis.

Convulsions due to systemic infections and other causes—Convulsions frequently occur due to an infection and may lead to errors in diagnosis. An analysis of our data shows that convulsion due to pyrexia (14), meningitis (18), tetany (7), encephalitis (5), cerebro-vascular accident (4), paraplegia with flexor spasms (3), and epilepsy (1), were mistaken for tetanus. Patients presenting symptoms of convulsion should be thoroughly examined and other causes for convulsion should be excluded for proper diagnosis.

Infections of the mouth and throat—Dysphagia is a common symptom of tetanus. Difficulty in swallowing is also a common symptom of infections of the mouth and throat. Such infections leading to dysphagia can be easily mistaken for tetanus, and the present series shows that nearly 17 per cent of the cases were misdiagnosed as tetanus. The presenting symptoms were pain in the throat, dysphagia, and difficulty in opening the mouth. In some, fever was present. A thorough examination of the throat may not be possible due to trismus. If the patient has otorrhoea or gives a history of injury, the chances of diagnostic error are increased. A careful examination, however, that would lead to correct diagnosis is often not carried out because of hurry and carelessness. In patients presenting pharyngeal symptoms with complaints of dysphagia, if there is no risus sardonicus, neck stiffness or abdominal rigidity, tetanus can be excluded. In such patients the pain in the throat is localised to one side or the other, and even if the patient cannot open the mouth fully it is possible to examine the throat and reveal the true local condition. Enlarged and tender cervical lymph nodes would denote a septic focus.

Dental conditions—Conditions simulating lockjaw may often be due to some underlying dental cause. 14·56 per cent of the 364 cases who were suffering from some underlying dental causes were mistaken for tetanus. Caries, pyorrhoea, gingivitis, impacted molar, periodontitis and alveolar abscess were the conditions that simulated lockjaw. The patient usually sought advice for painful restriction of the jaw movement. Here again, a careful history and thorough local examination would have confirmed the diagnosis. The classical features of tetanus are absent—pain on opening the mouth is localised to one side, either in

upper or lower jaw, and the local condition is usually obvious on inspection. Enlarged tender cervical lymph nodes may be present and these all help to arrive at proper diagnosis. Radiological examination may be necessary to confirm the diagnosis.

Fracture of the maxilla and the mandible and subluxation of the temporomandibular joint accounted for 4 cases of wrong diagnosis. The immediate onset of symptoms after injury and examination of the local condition would have revealed the true condition.

Fever—Fever associated with backache (33), bodyache (54), and stiffness of neck (30) comprised the largest heterogeneous group. In 30 cases the fever was of short duration since after admission their temperature came down in a day or two without any treatment and there were no positive findings. It is difficult to understand why these cases were mistaken for tetanus by casualty officers. It might be that some of these patients may have given a history of injury, others might have had otorrhoea, and the patients might have complained of backache, pain in the legs, chest or body. History of accompanying rigors may be misinterpreted as spasms, leading to confusion with tetanus. But the classical features of tetanus were absent and that alone would have been sufficient to exclude tetanus. It has already been noted that fever may give rise to convulsion, and 14 cases of febrile convulsion were misdiagnosed as tetanus. 29 cases had painful stiffness of the neck, 18 presented symptoms of backache, but none of them had the other symptoms to tetanus. History of injury or otorrhoea in some of them might have misled the casualty officers. Even one case of tuberculous spine with backache and fever as the presenting symptoms was mistaken as one of tetanus. The localised tenderness was missed ; only the stiffness of the spine led to the error in diagnosis. 2 cases of smallpox, in which the usual prodromal symptoms of fever and backache were prominent, were admitted to the Tetanus Ward. One of them gave history of injury, and antitetanus serum has given, but next day the patient developed erythematous maculopapular rash over the face and extremities which was mistaken for serum rash, but when the rash became haemorrhagic, the correct diagnosis of smallpox was established.

Abdominal symptoms—9 patients had abdominal rigidity and pain that led to mistaken diagnosis. In 6 the underlying cause of abdominal pain could not be determined, whereas 3 patients were suffering from tuberculous infection of the abdomen.

Pain in the chest with fever due to pulmonary tuberculosis led to error in diagnosis in 2 patients. 17 patients had bronchopneumonia, which is often associated with pain in the chest and body with fever. It may be noted that many infections may give rise to pain in the chest and body associated with fever, and these cases should be thoroughly examined to arrive at a proper diagnosis.

Missed Tetanus

Tetanus is more often wrongly diagnosed than missed, as will be evident from our series. Only 50 patients, which comprised of 1·5 per cent of total admissions in the hospital during the period, were being treated for one or other condition and were referred later to the Tetanus Ward. Failure to diagnose tetanus, however, is much more serious because the delay in instituting appropriate treatment endangers life.

An analysis of Table 2 shows that the largest number of cases presenting symptoms of pain and stiffness of the neck or body, or bodyache with fever, were diagnosed as rheumatism and were treated as such. Absence of classical lockjaw led to error in diagnosis until the full picture was revealed. Cases with dysphagia and pain in the throat were treated for pharyngitis and these patients attended the E.N.T. outpatient department for days. 5 patients had abdominal pain and were referred to the surgical ward. In one of them, just before operation, minimal lockjaw was noticed when passing a tracheal tube for anaesthesia, and the correct diagnosis was then made. This patient, however, died later. Backache complained of by patients due to spasm of the back muscles, which is a symptom of tetanus, was treated as lumbago.

In almost all these cases, because trismus was absent or minimal, the diagnosis of tetanus was overlooked by the specialists who are not familiar with the clinical picture of tetanus, a disease often producing divergent early symptoms. The patients were treated in the outpatient department and attention was paid to the affected part and a full examination was not carried out.

Of interest is a case where the patient attended the casualty department for retention of urine. He was admitted to the surgical ward for 2 days where he was repeatedly catheterised and then discharged. When the patient came next day again with retention of urine to the casualty room, one of the residents working in the Tetanus Ward could, simply by looking at the patient, discern the presence of risus sardonicus but there was no trismus. The patient was admitted to the Tetanus Ward, trismus and other signs of tetanus

developed ; fortunately the patient recovered after treatment. In 2 cases the diagnosis of Bell's palsy was made, although in fact they were suffering from cephalic tetanus. In 2 other patients, trismus, although present, was missed and one was attributed to hysterical lockjaw and the other to carious teeth. Both these patients were later admitted to the Tetanus Ward for observation, and despite correct diagnosis and treatment one died.

Strychnine poisoning and hydrophobia can be mistaken for tetanus but we have not encountered any such cases.

Comments

Diagnosis of an early case of tetanus presents difficulties because many of the symptoms of tetanus occur in other diseases. Despite the best of care, this is unavoidable to a certain extent. Some medical officers who admit these patients in the emergency department when in doubt send them to the Tetanus Ward, where, during observation, it is found that the patient is suffering from some other condition. In the majority of cases, history of injury associated with any one of the symptoms of tetanus often misleads them. The number of cases misdiagnosed as tetanus would have been smaller if a detailed history was taken and careful clinical examination was performed. It is, however, gratifying to note that the casualty officers are increasingly aware of this deadly disease and it is certainly preferable to misdiagnose tetanus than to miss a case of tetanus.

Summary

Tetanus is more often misdiagnosed than missed. Failure to diagnose early tetanus carries the graver risk.

Out of 3,262 cases admitted to the Tetanus Ward, 364 (11·1 per cent) were found to be suffering from some other condition.

Early tetanus was missed in 50 cases (1·5 per cent) during the period, which were later referred from other departments to the Tetanus Ward.

The various diseases that give rise to symptoms simulating tetanus, leading to errors in diagnosis, are enumerated. It is stressed that trismus, dysphagia, convulsions, bodyache, backache, and pain in the abdomen may occur in other diseases.

The value of thorough clinical examination is stressed. When there is doubt about diagnosis, it is better to keep the patient under observation.

Acknowledgment

We are thankful to the Dean, K. E. M. Hospital, Bombay, for allowing us to use the hospital records, and also to the resident and nursing staff of the Tetanus Ward of K. E. M. Hospital for maintaining the records.

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NORMAL CEREBROSPINAL FLUID : A PHYSICAL, BIOCHEMICAL AND CYTOLOGICAL STUDY

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The cerebrospinal fluid is formed by the choroid plexus in the ventricles of the brain. It differs from plasma chiefly by the absence of colloids and pigments, the greater concentration of chlorides and lesser concentration of glucose.

The composition of the cerebrospinal fluid is altered by any one of the following fundamental changes, viz., by exudative inflammation of the leptomeninges, by any alteration in the composition of the blood as regards substances to which the choroid plexus is permeable, by any change in the permeability of the choroid plexus, or by any increase in permeability or any breach of continuity of the blood vessels at surafce, hence the diagnostic value of cerebrospinal fluid examination.

To assess the value as abnormal, one should be clear about the normality. Scarcity of reports on normal cerebrospinal fluid values in Indian literature led the author to work out its normal ranges.

Material and Methods

The cerebrospinal fluid in 50 normal individuals (25 males and 25 females) was examined (Table 1). All the subjects were examined clinically and investigated to exclude any disease which might produce changes in the cerebrospinal fluid. The results of statistical analysis of the data are presented in Table 2.

The usual technique for lumbar puncture and collection of cerebrospinal fluid was adopted. For measuring the pressure the spinal manometer used was of Adson's type (B.D.). For

TABLE 1—SHOWING FINDINGS OF CEREBROSPINAL FLUID IN (A) 25 NORMAL MALES AND (B) 25 NORMAL FEMALES

Serial No.	Name	Age (years)	Pressure (mm. H_2O)	Glucose (mg. %)	Proteins (mg. %)	Chlorides (mg. %)	Cells (/c.mm.)
		A. NORMAL MALES					
1	Y.N.	20	96	48	30	710	2
2	A.	20	106	50	40	680	6
3	C.H.	20	120	60	40	700	2
4	J.P.	35	70	60	38	740	3
5	D.N.	25	110	60	30	700	4
6	D.C.	35	90	70	42	700	3
7	D.M.	50	160	70	30	750	4
8	H.L.	35	142	40	30	710	3
9	L.R.	35	130	64	40	720	3
10	U.P.	30	150	48	40	740	5
11	D.N.	23	160	70	42	700	5
12	T.N.	60	98	58	42	720	4
13	M.M.	25	126	60	38	710	4
14	B.S.	26	150	44	42	740	5
15	B.L.	26	120	42	48	740	3
16	R.K.	20	200	40	26	730	4
17	D.R.	20	120	38	42	730	4
18	D.L.	20	140	42	48	740	5
19	H.L.	50	150	40	40	740	5
20	P.R.	20	120	44	37	720	4
21	J.S.	22	148	62	42	740	4
22	B.N.	45	100	48	38	720	5
23	M.L.	25	130	50	40	720	3
24	H.L.	30	100	60	24	720	3
25	P.L.	32	110	70	28	710	3
		B. NORMAL FEMALES					
1	M.	30	130	60	36	700	3
2	D.	50	100	60	30	720	2
3	V.D.	26	110	48	40	710	3
4	G.B.	50	104	60	30	720	4
5	M.D.	30	108	42	30	680	3
6	K.F.	36	132	64	42	710	5
7	A.	26	130	60	40	730	4
8	S.B.	24	140	52	30	720	4
9	K.	43	110	68	34	740	3
10	K.B.	40	140	54	38	720	6
11	A.	42	220	50	35	720	4
12	P.B.	41	140	48	38	710	6
13	L.B.	41	150	42	34	720	5
14	R.W.	43	110	60	32	740	7
15	R.K.	36	100	62	30	720	4
16	L.W.	32	110	64	30	720	3
17	P.W.	24	100	62	25	710	4
18	R.D.	31	108	50	30	710	6
19	V.P.	27	120	48	32	720	8
20	L.R.	29	110	44	34	730	3
21	L.K	26	130	48	38	740	2
22	P.W.	26	110	60	36	740	1
23	R.N.	24	138	65	40	700	1
24	P.W.	23	130	70	44	710	4
25	R.K.	21	120	60	42	730	2

Globulin was absent in all samples.

studying the chemical composition of the fluid, King and Wootton's (1956) microanalysis techniques were adopted for total proteins, globulin and glucose. For chlorides King and Wootton's (1951) techniques were followed. For cytological examination and for organisms routine techniques were followed.

OBSERVATIONS

All cerebrospinal fluid samples were clear, colourless and sterile. Other findings are presented in Table 1.

DISCUSSION

Table 2 shows the statistical mean, range and standard deviation of normal cerebrospinal fluid of males and females studied respectively for pressure, glucose, proteins, chlorides and cellular content.

The normal figures obtained in males were compared with those obtained in females. There was no statistical difference in the various contents of cerebrospinal fluid in the two sexes, as is evident from Table 2. In normal females calculated 't' for pressure was 0·31 ; glucose, 0·84 ; proteins, 1·2 ; chlorides, 0·66 and for cells, 0·1 showing insignificant difference in all (Table 2).

Combined statistical analysis of cerebrospinal fluid of males and females is also shown in Table 2.

TABLE 2—SHOWING STATISTICAL ANALYSIS OF CEREBROSPINAL FLUID IN (A) 25 NORMAL MALES, (B) 25 NORMAL FEMALES AND (C) COMBINED GROUP COMPRISING THE 25 NORMAL MALES AND 25 NORMAL FEMALES

	Pressure (mm. H_2O)	Glucose (mg.%)	Proteins (mg.%)	Chlorides (mg.%)	Cells (/c.mm.)
	A. NORMAL MALES				
Mean ...	125·8	53·8	37·4	721·2	3·8
Range ...	70 to 200	40 to 70	28 to 48	680 to 750	2 to 6
S.D. ...	±27·5	±10·8	±6·5	±17·9	±1·0
	B. NORMAL FEMALES				
Mean ...	124·0	56·0	34·8	718·1	3·9
Range ...	100 to 220	42 to 70	25 to 44	680 to 740	1 to 8
S.D. ...	±15·4	±8·4	±4·9	±14·2	±1
Calculated 't' ...	0·31	0·84	1·2	0·66	0·1
	C. COMBINED NORMAL MALES AND NORMAL FEMALES				
Mean ...	124·9	54·9	36·1	719·9	3·9
Range ...	70 to 220	40 to 70	25 to 48	680 to 750	1 to 8
S.D. ...	±26·2	±9·4	±5·7	±15·9	±1·2

The normal figures obtained were compared with those obtained by Western workers (Merrit and Fremont Smith 1937). There was no statistical difference between the two.

Summary

Normal physical, biochemical and cytological study was undertaken in 50 normal subjects.

Acknowledgment

The author is thankful to Prof. P. N. Laha and Prof. B. P. Saxena for valuable guidance.

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BLOOD SUGAR LEVEL AND GLUCOSE TOLERANCE IN SYPHILIS

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Introduction

Available biochemical data in syphilis is scanty in medical literature as in other treponemal infections like yaws and pinta (Adams and Maegraith, 1953). As untreated syphilis is a long continued disease, it is naturally expected that in the absence of treatment some biochemical change may appear in the body during the course of illness.

A mild or sometimes severe jaundice is seen in well marked secondary syphilis and also when this condition relapses. It is distinguished from other forms of hepatitis by the presence of accompanying lesions and by the serum reactions (Wilcox, 1945). Syphilis of the liver and spleen should have been common, since both have enormous capillary seives which strain out and dispose of large amount of circulating toxic and infectious material with minimum of symptomatic protest. As in the nervous system, so also in the liver and spleen there is probably high incidence of early reaction. It is apparent that syphilis of the liver is much more common, or at least is much more commonly recognised than syphilis of the spleen (Stokes *et al*, 1945). The frequency of liver involvement in syphilis and the role of the liver in maintenance of normal blood sugar tempted us to undertake the present investigation.

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Materials and Methods

Twenty male patients between the ages of 25 and 30 years having primary sero-positive secondary and late syphilis were selected for the present investigation. All the blood samples were M.K.R., Kahn, W.R. (Price's technique with cardiolipin antigen) and V.D.R.L. (1 : 8 to 1 : 28 dilution) positive. The patients were on fast from the previous night to the morning of the day of experiment. A sample of blood was drawn from every patient before the experiment for determination of the fasting blood sugar level. Then the patients were given 50 g. of glucose in 100 ml. water to drink. The venous blood was drawn at ½-hour intervals for a total period of 2½ hours for oral glucose tolerance test (Kolmer and Boerner, 1953). Urine samples were collected before the experiment and during the course of experiment depending on the patient's natural act of micturition. The blood samples for sugar were estimated by Hagedorn and Jensen method (Hawk *et al*, 1947). The urine samples were examined by Benedict's method.

Results

The results of the investigation are shown in Tables 1 and 2 and Fig. 1.

Table 1—Showing Fasting Blood Glucose Level in Syphilitic Patients

No. of cases		Mean Glucose/in fasting blood.
20	...	74·20 mg./100 ml.

TABLE 2—SHOWING GLUCOSE TOLERANCE TEST IN SYPHILITIC PATIENTS

No. of cases		Blood sugar level in mg./100 ml. of blood					
		0 hour	½ hour	1 hour	1½ hour	2 hour	2½ hour
20	Mean	74·2	108·5	96·4	85·4	77·2	71·4
	S.D.	±7	±15·26	±11·5	±12·04	±7·81	±8·7

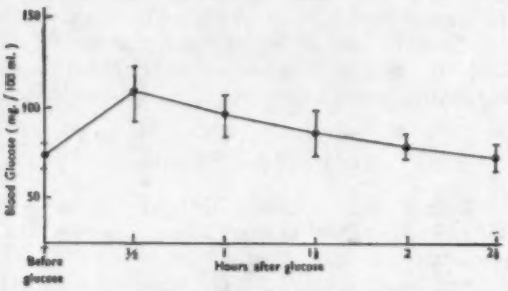

FIG. 1—SHOWING GLUCOSE TOLERANCE CURVE IN SYPHILIS

DISCUSSION

The fasting blood sugar level in all subjects were between 66 to 92 mg./100 ml. Regarding the glucose tolerance test the highest level reached was at ½ hour and the level was between 95 to 122 mg./100 ml. The blood sugar level returned to the pre-experimental level within 2½ hours. All the samples of the urine before, during and after the experiment were free from glucose. From the above findings it can be concluded that the hepatic and pancreatic functions in relation to carbohydrate metabolism are not disturbed in different stages of untreated cases of syphilis. But this does not rule out whether other functions of the liver remain unaltered in such chronic infection.

SUMMARY

20 male patients between the ages of 25-30 years having primary seropositive, secondary and late syphilis were selected for investigation.

The fasting blood sugar level was found to range between 66 to 92 mg./100 ml. of blood.

Single dose oral glucose tolerance test was performed and the highest peak was found to reach at ½ hour and blood sugar came back to fasting level within 2½ hours.

All the samples of urine were sugar free.

Hepatic and pancreatic function in relation to carbohydrate metabolism is not disturbed in different stages of untreated syphilis.

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BLOOD SUGAR LEVEL AND GLUCOSE TOLERANCE IN SYPHILITIC PATIENTS AFTER ADMINISTRATION OF CHLORAMPHENICOL

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INTRODUCTION

Chloramphenicol is a broad spectrum antibiotic which is widely used in various diseases. It has been found effective in primary, secondary and late syphilis, when administered by oral route. Side reactions and haematological changes from its use have been observed. Roy *et al* (1960) have observed the fasting blood sugar level and the nature of glucose tolerance in primary seropositive, secondary and late syphilis. Contradictory reports are available regarding the possible effect of antibiotic in carbohydrate metabolism (Chatterjee *et al*, 1959). The present investigation was undertaken for finding out the possible role of antibiotic in carbohydrate metabolism, specially in case of syphilis where prolonged administration is necessary for cure.

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Material and Methods

24 male patients between the ages of 30 and 35 years having primary seropositive, secondary and late syphilis were selected for the investigation. All the patients were seropositive in relation to M. K. R., Kahn., W. R. (Price's technique with cardiolipin antigen) and V.D.R.L. (1 : 8 to 1 : 28 dilution). They were hospitalised for 3 days and their diet was restricted throughout the investigation. At first, before starting the treatment, the fasting blood sugar level was estimated for consecutive days and the average result was taken. This was followed by oral glucose tolerance test along or with routine urine analysis (Table 1).

The patients were then treated with chloramphenicol in doses of 2 capsules 4-hourly for 16 days. The total dose given was 48 g. This dose has been found most effective in curing syphilis. On every 4th day the fasting blood sugar was determined and urine analysis performed. The patients were divided into two groups for glucose tolerance test. In one group the glucose tolerance test was performed on the 16th day of treatment, and in the other group on the 32nd day from the first day of experiment with a view to detect the late effect of chloramphenical on the glucose tolerance curve. The glucose tolerance test was done according to single test (Tables 2 and 3) and the blood sugar was estimated by Hagedorn and Jensen method (Hawk, *et al* 1947).

Results

The results are shown in Tables 1, 2 and 3 and Fig. 1.

Table 1—Showing Fasting Blood Sugar Level before Chloramphenicol

No. of cases	Fasting blood sugar level (mg./100 ml.)	
	Mean	S D
24 ...	78	±7·54

Table 3—Showing Glucose Tolerance Test in 24 Cases before and after Chloramphenicol

	Blood sugar level (mg./100 ml.)					
	0 hour	½ hour	1 hour	1½ hour	2 hour	2½ hour
BEFORE CHLORAMPHENICOL						
Mean	76	111	100	87	77	70
SD	±10·24	±12·4	±13·7	±9·5	±7·8	±10·6
AFTER CHLORAMPHENICOL						
Mean	75	113	105	93	82	74
SD	±13·7	± 8·7	±11	±7·4	±6·6	±11

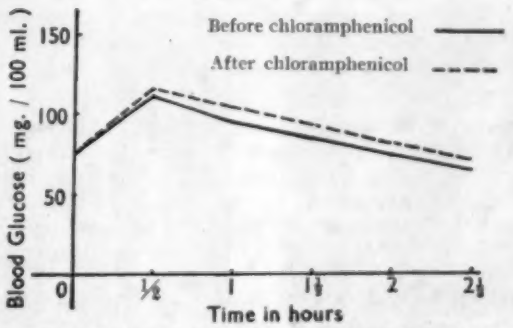

Fig. 1—Showing Glucose Tolerance Curves in Syphilis Before and After Chloramphenicol

Discussion

The fasting blood sugar level after oral administration of chloramphenicol does not show any marked alteration than the fasting level before chloramphenicol treatment. The blood sugar level obtained at every fourth day showed variation of ±5 to 8 mg./100 ml. The sugar level was detected every fourth day, with a view to observe the early as well as the late effect of chloramphenicol. The results indicate that chloramphenicol has no early or late effect on blood sugar level. The glucose tolerance test before and after chloramphenicol showed the similar nature of

Table 2—Showing Fasting Blood Sugar Level in 24 Cases after Chloramphenicol

Control (average for 3 days)		Blood sugar level (mg./100 ml.)							
		4th day	8th day	12th day	16th day	20th day	24th day	28th day	32nd day
Mean ...	78	71·6	75	74·6	76	75	75	76	77
S D ...	±7·54	±3·94	±12	±12·2	±10·2	±9	±12·3	±6·8	±12·4

curve. The group in which the glucose tolerance test was done on the 32nd day of treatment does not show any variation in the nature of the tolerance curve with that of the control. All the samples of urine were sugar free throughout the experiment. It can thus be concluded that chloramphenicol has no effect on the blood sugar level, endocrine secretion of the pancreas and the hepatic function with regard to the carbohydrate metabolism. Further, chloramphenicol treatment in cases of incipient diabetes is safe.

Summary

24 male patients between the ages of 30 and 35 years, having primary seropositive, secondary and late syphilis, were selected for this investigation.

The patients were hospitalised for 5 days and fasting blood sugar estimation, urine analysis and glucose tolerance test were performed before treatment with chloramphenicol.

Chloramphenicol was given orally in doses of 2 capsules 4-hourly (50 mg. per kg. body-weight) for 16 days. The total dose given was 48 g.

The fasting blood sugar was estimated at four days intervals and in one group glucose tolerance test was performed on the 16th day and in the other group on 32nd day, to see the early and late effects.

The fasting blood sugar level did not alter after chloramphenicol and the glucose tolerance curve did not show any variation from the control. All the samples of urine were free from sugar.

From the above observations it can be concluded that chloramphenicol has no eflect on blood sugar level, and on endocrine secretion of the pancreas and the hepatic function in regard to the maintenance of blood sugar level, and indirectly to carbohydrate metabolism.

Acknowledgment

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PRACTITIONERS' SERIES

EXFOLIATIVE DERMATITIS AND ITS THERAPY

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Introduction

Exfoliative dermatitis or erythrodermia is one of the most distressing and serious skin disorders. It is characterised by generalised inflammation of the skin causing erythema, oedema and profuse scaling. It may be of primary or secondary origin. Primary erythrodermias are relatively rare. Erythrodermias may occur from early infancy to late senility but the commonest age incidence is between 20 and 40 years.

Classification

From aetiological standpoint erythrodermia is classified into primary and secondary varieties.

Primary Erythrodermias :

1. Congenital ichthyosiform erythrodermia (Broq).
2. Savill's dermatitis exfoliativa epidemica
3. Erasmus Wilson's subacute primary erythrodermia
4. Chronic primary erythrodermia of Hebra and Jadassohn
5. Ritter's dermatitis exfoliativa neonatorum
6. Leiner's erythrodermia desquamativa.

Secondary Erythrodermias :

1. Due to systemic use of drugs like arsenic, bismuth, gold, mercury, sulfonamides, barbiturates, quinine, sera, penicillin etc.
2. Associated with skin diseases like psoriasis, seborrhoeic dermatitis, pityriasis rosea, eczema and premycotic stage of mycosis fungosides.
3. Associated with systemic diseases, e.g., leukemia and lymphadenoma.

Description

Congenital ichthyosiform erythrodermia of Broq is rarely seen in children. Its aetiology is not known and it presents a general clinical picture of erythrodermia associated with ichthyosis.

Savill's dermatitis exfoliativa epidemica is exceedingly rare. It may occur in epidemics in beg-

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gar homes and asylums. Approximately 10 per cent cases die. It is probably infective in origin.

Erasmus Wilson's subacute erythrodermia is patchy to begin with and it covers the whole body in a few days. Scales are large (even upto several inches) and papery. It may last for months.

Hebra's chronic form takes months to cover the whole body. Here scaling is very fine and the patient may die in few years.

Ritter's dermatitis exfoliativa neonatorum is a rare condition occurring in 1—5 weeks old infants. Approximately 50 per cent cases prove fatal while others recover in 4—6 weeks. It is probably pyogenic in origin.

Leiner's erythrodermia desquamativa is a chronic condition occurring in children and is associated with gastro-intestinal troubles and seborrhoeic dermatitis of the scalp.

The secondary erythordermias associated with skin diseases might be due to the use of strong local remedies like cignolin, chrysarobin, tar or due to unknown aetiology. They completely replace the original disease which crops up again when the exfoliation subsides. Internal administration of heavy metals like arsenic, bismuth, mercury and other drugs e.g. penicillin, quinine, barbiturate, etc., may lead to generalised exfoliation.

Arsenical exfoliative dermatitis occurs roughly in 1 : 2000 cases treated with it. It usually begins after the course of injections on extremities as a maculopapular eruption. If untreated or late treated it proves fatal.

Erythrodermia may be associated with systemic diseases e.g. leukemia and lymphoblastomas. The most serious is the erythrodermia occurring in the premycotic stage of mycosis fungoides. It is characterised by intense itching and is invariably fatal.

Clinical Features

Usually there is sudden onset with acutely developing erythema. Erythema is accompanied by oedema and followed by exfoliation. The skin, the hair and the nails are exfoliated in very severe cases. The skin subjected to stress and strain exfoliates first. The palms and the soles of the feet are affected last. Exfoliation is accompanied by exudation of foul smelling serum. The mucous surfaces of the nose, the oral cavity and the throat may participate in the process. The patient is disfigured due to tumefaction of the lips, swelling of the ears and puffiness of the eyelids. In a fully developed case primary and secondary erthrodermias are rarely distinguishable. Chief constitutional symptoms are malaise, lassitude, chilliness and fever. The heat regulating mechanism of the skin being upset, chilliness is always a prominent symptom. It is more marked during morning hours. Pruritus occurs in paroxysms of varying intensity.

Diagnosis and Prognosis

The disease can well be differentiated from other scaly dermatoses like psoriasis, dermatitis seborrhoeica, pemphigus foliaccous and pityriasis rubra pilaris by recalling the diagnostic features of each. The cardinal features of exfoliative dermatitis are generalised erythema, oedema and exfoliation. Severe, untreated and late treated cases usually end fatally. Death usually occurs due to bronchopneumonia, pyaemia, septicaemia or cachexia.

Treatment

Every case of exfoliative dermatitis should be immediately hospitalised. High caloric and low salt diet should be given. Nails should be clipped and handbags should be provided to prevent scratching.

Local treatment—In exudative stage 2 per cent boric compress, potassium permanganate 1 : 10,000 or silver nitrate 1 : 1,000 should be applied. In acute non-oozing stage calamine lotion and in subacute and chronic stages calamine cream with neomycin work well. Local treatment, if properly done, prevents sepsis and expedites cure.

Systemic therapy—BAL (British Anti-Lewisite) forms the specific therapy for exfoliative dermatitis due to arsenic, bismuth, mercury and gold. 10 per cent solution of sodium thiosulphate previously used for the same purpose has now been superseded by BAL. BAL is provided in 2 c.c. ampoules containing 5 per cent 2 : 3 dimercaptopropanol in arachis oil. Depending upon the severity of the case it is administered 2 c.c. I.M. 6 hourly, 8 hourly, 12 hourly and lastly once daily for 7-10 days. The earlier the course is started the better the results. Corticosteroids form a very valuable and life-saving weapon in all forms of erythrodermias. Due to anti-allergic and anti-inflammatory effects, they render excellent results in erythrodermias. Prednisolone in daily doses of 20-50 mg. with 1 g. pot. chloride and 1000 mg. vitamin C proves very effective in combating this distressing disorder. Glucose and sedatives should be given as necessary. No patient should be allowed to pass restless nights. In cases with secondary infection, antibiotics should be advised.

Radiological treatment—X-rays do not form a routine anti-erythrodermic measure. The roent-

gen-bath as recommended by Prof. Schirren with very soft and superficial x-rays of 2 mm. HVD with daily doses of 50 r. prove very effective in resistant and chronic cases of erythrodermias. I found them quite effective in cases of erythrodermias due to mycosis fungoides in their premycotic stage.

Summary and Conclusion

In spite of ready availability of effective remedies, the termination is likely to be fatal in most of the erythrodermias. This is accounted for by lack of early and correct treatment. This short review is, an attempt to give essential information on this potentially dangerous skin disorder, to the general practitioners.

SPECIAL ARTICLES

CLINICAL BEHAVIOUR IN CARCINOMA PROSTATE

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Cancer of the prostate is one of the commoner cancers that occur in males beyond the age of fifty years. While figures for India are not authoritatively available our own experiences in a recently developed urology service have indicated that approximately 0·5 per cent of surgical admissions and 5 per cent of male urological cases consist of advanced prostatic malignant disease. This is of interest because the large number of patients with urinary calculi and benign prostatic hypertrophy that occur here may serve to create an imbalance in statistical analyses. In the United States one case in seven of prostatic enlargement in men past 55 years is cancerous, and figures elsewhere have suggested that 10 per cent of prostates removed are found on histopathology to be malignant.

Little is known regarding the aetiology of prostatic cancer, and its relation to prostatitis and benign prostatic hypertrophy have not been demonstrated. The work of Huggins (1941) with regard to hormonal relationships of prostatic cancer, indicating that administration of androgens increases the activity of prostatic cancer and administration of oestrogen decreases its activity, is of great interest and has stimulated a tremendous amount of research in this and other endocrine supported cancers. Sequential endocrine ablation has only a temporary suppressive effect on the growth of the tumour.

Pathology

Carcinoma of the prostate usually commences in the periphery of the gland. Invasion of the capsule is common even with small symptomless tumours and is invariably present when the patient is symptomatic. The prostatic urethra is not often affected even in larger tumours, while the bladder and seminal vesicles are often infiltrated by active cancer but rarely affected by asymptomatic disease. Ureteral involvement is not uncommon. The rectum is not infrequently involved and rarely the lesion may be clinically mistaken for a primary rectal cancer. Lymph node metastases are common, the internal iliac and lumbar nodes being most often affected. Sometimes the primary tumour fuses with involved lymph nodes, the resultant mass filling the pelvis and invading bone. The tumour may compress or infiltrate vessels and nerves of the pelvis and obstruct the passage of urine.

Bone metastases are frequent. These deposits are most common in the lumbar vertebrae, pelvis and femurs. Tumour cells from the prostate may reach these bones through the complex network of veins surrounding the vertebral column. Increased intra-abdominal pressure due to straining or coughing may cause blood flow to be diverted into the vertebral system, bypassing the portal, caval and pulmonary circulations and carrying microscopic tumour emboli to the bones. Tumour cells are also carried by the systemic circulation, and metastases are likely in any bone carrying marrow. In some cases widespread infiltration of marrow causes anaemia.

The roentgenologic appearance of bone metastases is variable. Osteoblastic nodules appear as dense rounded shadows and rarer osteolytic lesions appear as localised areas of bone destruction. When metastatic implants are small or when diffuse infiltration of the marrow spaces occurs without destruction of the bone trabeculae, the roentgenogram may appear normal. With diffuse marrow infiltration and much overgrowth of supporting stroma the x-ray appearance is similar to that of Paget's disease of the bone.

Methods of Diagnosis

The consensus has always been that rectal examination by an experienced clinician is the best diagnostic tool short of open biopsy. Papanicolaou smears obtained after prostatic massage have not been encouraging in the diagnosis of early cases. Since symptoms are lacking in early pros-

tatic cancer, routine rectal examination in all males beyond the age of 45 years as part of a general physical examination may be the only way of detecting lesions localised within the capsule.

Even so there are bound to be cases where the disease may not even be suspected on rectal examination, yet the histopathology of the removed prostate gland is adenocarcinoma.

Biopsy—Palpation of stony hard nodular lesions are the usual reasons for obtaining a biopsy of the prostate gland. This may be performed as an outpatient procedure using the Vim Silverman needle or some modification of it through the perineal route. It is not entirely innocuous ; pain, bleeding or prostatocystitis may result but these complications occur less frequently and less severely than with transurethral or open methods of biopsy. Unfortunately this method is not 100 per cent successful in obtaining suitable material, and one must still rely on clinical acumen.

Value of enzyme studies—Following the original investigation of Gutman and Gutman (1938), total serum acid phosphatase estimation has been helpful in the diagnosis of cancer of the prostate. The difference noted by Abdul-Fadl and King (1948) between prostatic acid phosphatase and that produced by the liver, spleen and red blood cells has given much specificity to the enzyme. Recent clinical studies have demonstrated an elevation of the prostatic fraction in patients with active prostatic cancer. This has not been confirmed by other workers. It is recommended that rectal examination, palpation, or massage of the prostate gland should not be done within 12 to 24 hours before venepuncture for acid phosphatase determination ; for such manipulation may increase both true and total serum acid phosphatase values. It must be realised however that in only about 40 per cent of patients suffering from carcinoma of the prostate, is the formol-stable acid phosphatase raised above normal (1 to 3 King-Armstrong units). A reading between 3 and 5 units is suspicious and above 5 units practically diagnostic. The serum acid phosphatase level is also useful in determining the response to hormonal therapy. Very often with clinical and radiological improvement the serum acid level comes down also.

Treatment

Prostatectomy is only possible in localised cancer. Radical procedures are certainly risky but in selected cases may offer better 5-year cures. It should be realised however that patients with more advanced disease and other complicating problems are poor candidates for major surgery. Endocrine treatment is of particular interest. Even when metastases have occurred the therapeutic effects are often striking. Orchiectomy followed by oestrogen therapy is the usual method employed. Though not curative, satisfactory palliation can be promised to many patients.

Stilboestrol has been used in routine mangement. It is an inexpensive drug and though there are definite side-effects, with judicious adjustment of dosage it is often possible to strike a mean which keeps the disease under control and is yet not too uncomfortable for the patient. The patient has to understand that this therapy is life-long, and sometimes when relapse occurs after orchiectomy and oestrogen administration, techniques for altering the function of the adrenal cortex may be of value. These consist essentially of bilateral adrenalectomy, cortisone administration or irradiation of the pituitary or hypophysectomy. It is felt by many that these radical steps are of no practical value and the short period of palliation that is expected does not justify the severity of the operation. In some instances nitrogen mustard therapy is useful for the control of pain in disseminated prostatic cancer.

Irradiation either with deep x-ray or radium has given unsatisfactory results and is further complicated by the secondary effects on the bladder and rectum. The availability of radioactive isotopes that destroy tumour tissue and yet do not penetrate to any great extent has opened up new vistas in the management of this disease. Radioactive gold seems to fulfil all the criteria required for radiation therapy in this region. Its short half-life, nontoxicity, beta emitting properties, and ability to remain at the site of injection are factors for which its use is being more popularly accepted.

The clinical features are exemplified in the case reports that follow.

Case Reports

Case 1—J. S., a 72-year-old male, was seen in May, 1958 complaining of progressive dysurea and frequency of micturition for one year. No history of retention of urine. Rectal examination revealed a moderately enlarged firm prostate, and no nodules were palpable. The blood urea was 45 mg. per cent, Haemoglobin 10 g. per cent, urine showed a few pus cells, serum acid phosphatase 3 K.A. units. A one-stage Freyer's prostatectomy was performed. At operation the prostate appeared hard and difficult to enucleate; there was considerable haemorrhage which was controlled with gelfoam pack after shelling out the enlarged part of the gland. Post-operatively he made an uneventful recovery. The pathology report on the gland was adenocarcinoma.

He was put on stilboestrol 5 mg. t.d.s. straightaway and was discharged from hospital on the 18th postoperative day. After 3 months he began to have some pain in his breasts and the dose of stilboestrol was reduced to 5 mg. b.d. and later to 2 mg. b.d. He has continued well on this regime and his serum acid phosphatase has remained normal.

Case 2—M. R., a 58-year-old male, was admitted for treatment of dysurea and severe frequency and backache for 6 months. Rectal examination revealed a hard nodular prostate and x-ray of the chest revealed multiple secondary deposits in the chest and x-ray of pelvis showed deposits in the pelvis. Blood urea was 50 mg. per cent, serum acid phosphatase 4 K.A. units. Orchiectomy was performed and the patient was put on stilboestrol 5 mg. t.d.s. This caused considerable relief of his symptoms and x-ray taken 3 months later showed some improvement in the appearances. The dose of stilboestrol was cut down to 2 mg. b.d. and the patient attended the clinic for a period of 9 months after his first visit.

Case 3—H. S. was admitted for treatment of retension of urine since 3 days. He had been having progressive dysurea since 3 months. Rectal examination revealed a very large firm prostate, hard in some places. Blood urea was 55 mg. per cent, serum acid phosphatase 3 K.A. units. After preliminary catheter drainage for 3 days a one-stage prostatectomy (Freyer's) was performed. He stood the operation well and was discharged on the 28th postoperative day. The pathology report on the prostate was epidermoid carcinoma and he was started on stilboestrol 5 mg. t.d.s. straightaway after performing orchiectomy. Some urinary infection persisted and in spite of chemotherapy and increased dose of stilboestrol his symptoms of burning pain and dysurea returned. He was readmitted 3 months later when cystoscopy revealed the growth to be infiltrating the bladder. A bilateral ureteric transplant was performed as a preliminary but he went downhill and expired with renal failure on the 15th postoperative day.

Case 4—J. S., 57 year old male admitted for the treatment of retention of urine for 2 days. He had progressive dysurea for the last one month. Rectal examination revealed an enormous prostate, hard in places. Blood urea 60 mg. per cent, serum acid phosphatase 2·5 K.A. units; x-ray chest and pelvis no secondaries seen. A catheter could not be passed and so suprapubic cystostomy was performed. Ten days later Freyer's prostatectomy was performed and a large hard gland removed. There was considerable haemorrhage which was controlled with a gelfoam pack. The pathology report on the gland was adenocarcinoma. The patient was put on stilboestrol 5 mg. t.d.s., and orchiectomy was performed. The suprapubic fistula would not close and the patient was in considerable pain. Increasing the dose of stilboestrol also did not help, and there were two episodes of secondary haemorrhage on the 30th and 40th postoperative days. He developed severe oedema of the right lower extremity indicating pressure on the iliac veins, progressively got worse and expired two months after his operation.

Case 5—S. S. was admitted for investigation of progressive dysurea for the last one year. He had been seen elsewhere and informed that he had carcinoma of the prostate gland. Rectal examination revealed a very hard prostate gland, nodular in parts. Perineal biopsy was performed and pathology report was adenocarcinoma. Blood urea 40 mg. per cent, serum acid phosphatase 2·8 K.A. units. X-ray chest and pelvis showed no secondary deposits. The patient was put on stilboestrol 5 mg. t.d.s. and within 3 weeks there was a marked improvement in his symptoms, and the patient also felt subjectively much better. After three months of treatment the dose had to be cut down to 5 mg. b.d., because the patient had considerable pain in the breasts. He maintained his improvement over the last one year and at the time of report was on a maintenance dose of stilboestrol 2 mg., b.d.

Case 6—S. R., a 72-year-old male, was seen in the urology clinic for progressive dysurea over the last one year, and history of two attacks of retention previously treated by catheterisation. He was also an asthmatic for the last 5 years. Rectal examination revealed a very hard nodular prostate. Blood urea 50 mg. per cent, serum acid phosphatase 4 K.A. units; x-ray chest showed deposits in the lungs. He did not have a full bladder and he was put on stilboestrol 5 mg., t.d.s. for one month. This did not immediately produce an improvement, and the dose was increased for a time to 15 mg., t.d.s. and with this the patient responded remarkably well, his dysurea diminished, x-ray chest showed decrease of the secondaries. The dose had subsequently been cut down to 5 mg., b.d. because of toxic effects, and on this dosage the patient was very comfortable.

Comments

The above cases exemplify some of the types of carcinoma prostate met with, their clinical behaviour and response to treatment. Case 3 is a rare type of epidermoid carcinoma probably due to metaplasia, and its response to stilboestrol therapy was unsatisfactory. Case 4 was a fulminating carcinoma which also did not respond to therapy. Operation in both these cases was forced by reason of their retention, and it is possible that a transurethral resection of a passage for the urine would be adequate in such cases.

The other four cases show what can be achieved by oestrogen therapy. Stilboestrol has been used here as a routine, as it is cheap, though there are other oestrogens like ethinyl oestradiol (0·05 mg. daily) which are reported to be less toxic and should certainly be tried when the patient cannot tolerate stilboestrol.

The dose of stilboestrol can be increased to a very high level of even 200 mg. a day in an effort to get the carcinoma to respond to this therapy. Once the disease is controlled the dose can be readjusted to an optimum level.

SUMMARY

Experiences with carcinoma of the prostate are discussed. Cases rarely come early enough to warrant radical prostatectomy, and the results of the less risky hormone treatment compare favourably with the results obtained by surgery. Oestrogen therapy can never be expected to cure cancer of the prostate but it can prove to be a very useful palliative measure.

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CORNEAL SURGERY AND EYE-BANK ORGANISATION : BASIC CONCEPTS AND SCOPE IN INDIA*

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INTRODUCTION

One of every 500 persons in India is totally blind and many more are economically blind also. A fifth of the world's total blind is a national problem. The solution is neither simple nor uniform. There is the problem of lenticular blindness due to cataract which needs more eye surgeons, more eye-camps and better appreciation of the safety and advantages of early cataract surgery. There is a second group of the incurably blind due to absolute glaucoma, optic atrophy, phthisis bulbi or the staphylomatous eyes for which the approach is socio-economic rehabilitation, a problem deserving attention of the government and the social bodies.

It is the third group, the corneal blindness due to corneal scars, caused by the ravages of trachoma, the scourge of smallpox, the infective corneal ulcers and the oncoming potent influx of industrialisation that calls for still more urgent attention to the advancement of corneal surgery and the organisation of regional eye-banks.

REVIEW OF BASIC CONCEPTS

Next to glaucoma, the cornea in recent years has become the most important subject of basic research. The metabolism of the cornea, the nutrition of the cornea, the transparency of the cornea, viability of the corneal endothelium, the immunological reactions and the biochemistry of the muco-polysaccharides are among the important facets of the present studies in the research laboratories.

It is necessary to understand some of these basic concepts particularly of the nutrition and viability of the avascular corneal tissue. These two factors are most significant for the transparency of the cornea (Paton, 1955 ; Rycroft, 1955).

Nutrition of the cornea is mainly by diffusion from the limbal vessels, through the lymphatics getting into the corneal tissue through the interlamellar spaces. Therapeutic use of contact lens excluding the contact of air from the anterior surface of the cornea and experimental studies by isolating the aqueous in the anterior chamber from the posterior surface of cornea by injecting air in the anterior chamber and the cornea yet maintaining transparency are sufficiently suggestive that diffusion through the anterior and posterior surfaces of the cornea is not significant as source of nutrition.

If this is true, functional and nutritional viability of the surrounding tissue in which a graft is placed is highly important for maintaining the transparency of the graft. That is why a donor graft should be surrounded by a healthy transparent cornea at least along more than half its circumference if the graft is to receive adequate nourishment and remain healthy and transparent. If, on the other hand, a graft is placed in a ring of densely opaque and nutritiously dead cornea with scarring having blocked the channels of nutrition, the graft surrounded by such cornea may too become opaque and die of starvation. This has placed obvious limitations on the suitability of the recipient eye for a grafting operation.

Another important fact to appreciate is the importance of the single cell posterior endothelial layer of the cornea for the viability of the corneal tissue. Although not clearly understood, the endothelium of the cornea is the first tissue to die after extinction of life, and that explains why a donor graft removed more than six hours after death or stored for more than 4-6 days even far below the freezing point dvelops an endothelial oedema and in the circumstances the cornea is not likely to remain clear if grafted to a recipient eye. It also explains the larger incidence of successes in lamellar keratoplastly where only the anterior part of the thickness of the cornea is used and the endothelium does not form a part of the donor material in contrast with the penetrating

*Written after a study tour of U.S.A. and Canada on a T. C. M. Fellowship.

keratoplasty where the whole thickness of the corneal tissue including the endothelium is grafted as donor material.

Another important concept to understand is the source of the donor material. Grafting of a tissue could be autogenous like skin grafting where the tissue is transferred from one part of the body to another part in the same individual. It could rarely be applicable to corneal transplants and when so, is an excellent donor material. The grafting could be heterogenous when the tissues of one species are grafted on to another species, e.g., animal to man. Such a possibility is not likely in the forseeable future. The third type is the homogenous graft like the present day corneal grafting from one human being to another human being. The present position is that for all practical purposes the eyes of a living person or the ones removed within 4-6 hours after death are the only ones acceptable for successful grafting.

This introduces the problem of availability of the donor human material, its storage when available and its viability when stored. Such an organisation is called the Eye Bank like the money banks, blood banks, the bone banks and the artery banks. The eye bank has, of course, to be the safest for the precious diamonds of the nature the eyes are.

The basic problem therefore is not so much the carpentry of corneal surgery as it is called. The more important consideration is the availability of the donor human material, and the homogenous material of one individual must remain functional and transparent when grafted on to another person.

Historical Review

Corneal grafting had been conceived as a possibility long before the first successful grafting was reported by Zirm (1906). Earlier Reisinger, Marcus, Powers, Von Hippel and Fuchs were among those whose trials and newer conceptions kept corneal surgery as a live possibility though in those days surgery had not yet stood on its own legs. It was Elschnig (1908) who first started modern keratoplasty and Filatov (1913) soon joined him and both laid the solid foundation of the present successes. But the credit of taking keratoplasty out of experimental stages goes to Castroviejo (1932) who among the living corneal surgeons is still improving upon techniques from time to time ever since 1931.

Attempts at scientific and regular corneal surgery in India have been too few in the midst of this vast sea of blindness. Modi (1958) reported six cases of penetrating keratoplasty with an unexplainable passiveness. The reasons for this lack of enthusiasm in this country inspite of heavy incidence of corneal blindness are rather varied. A busy eye surgeon in this country has enough cases on hand, cataracts alone providing more than his bread and butter. Hesitation in entering a field strewn with uncertainties detracted the younger surgeons. Practice of acrobatics in eye surgery like the grafting without stitches with unseen failures would in the long run dishearten even the optimists and the brave.

Scope and Limitations of Corneal Surgery

It is very true today that corneal surgery is no longer in the experimental stages. Scientific corneal surgery in selective recipients is a practical proposition carrying with it more successes than failures. Table 1 amply proves the rapid change in the prognosis during the last 12 years as reported in the Transactions of the American Academy of Ophthalmology and Otolaryngology:

Table 1—Showing the Progressive Improvement in the Prognosis of Corneal Surgery

Clinical condition	Prognosis in 1947	Prognosis in 1959 (improved to)
Conical cornea ...	65%	90%
Hereditary dystrophy ...	58%	75%
Fuch's corneal dystrophy ...	0%	65%
Interstitial keratitis ...	49%	75%

The problem in India has however to be looked from a different aspect. The above named conditions are among the least common in this country and certainly are not responsible for the heavy incidence of blindness. Our problem is trachoma, its sequelae and complications resulting in ulcers and opacities, which not infrequently cover the whole cornea and quite often have perforated and are accompanied by anterior synechiae. It is true that a host cornea opaque in its whole extent and depth is a nutritiously dead corneal tissue not able to feed its guest graft which in such circumstances is likely to die of starvation. It is often said that a total corneal opacity and vascularised cornea are the worst enemies of success in transplantation surgery and so corneal surgery is for ever doomed to failure in a trachomatous country like India. But this is not true at least in the superficial opacification and vascularisation of the trachomatous cornea. The trachomatous cornea may appear opaque along the whole extent and yet the opacity often limits

itself upto the Bowman's membrane or a little deeper and the posterior half of the thickness of the corneal tissue may yet be clear and healthy to keep the graft alive. The routine slit-lamp examination alone can convince the truthfulness of this statement.

Again the superficial trachomatous blood vessels in the cornea may not be a serious threat to the transparency of the graft. Blood vessels supply nutrition, provide useful enzymatic material and phagocytic scavengers. Blood, however, can also transmit higher dosage of antigenic material causing destructive immunological reactions. These last named reactions usually appear 3 to 4 weeks after surgery so that the trend now is to place a graft even in the small superficial vascularisation and deal with them if necessary a week after surgery by peritomy or radiation. Pretransplantation treatment of blood vessels is only indicated for the big blood vessels in large numbers when they are best dealt with by deep peritomy with perilimbal conjunctival transfixion with or without keratosclerectomy.

This however does not hold good in case of deep vascular channels from the ciliary vascular tree, e.g., when the trachomatous pannus is complicated by pathology deep in or behind the cornea or in cases of healed perforated corneas. And so the importance of clinical judgment to select suitable recipients cannot be overemphasised.

Corneal surgery has however its limitations too. The uncertainties of the yet unrecognised immunological reactions even in cases of grafts placed under the most suitable circumstances and ideal surgery done may lead to opacification of the graft any time 4 to 6 weeks after surgery or even long after. Regrafting in the same eye may succeed and cases have been recorded where five consecutive transplants have been done on the eye and only the last succeeded. The imperfect P.L. and P.R., established childhood amblyopia, nystagmus, pathology in the posterior segment of the eye, persisting pathological lesions still remaining active in the body are all contraindications to corneal surgery. And still more important, no scientific corneal surgery unit can yield fruitful results unless it is coordinated by an active basic research work, more so in a country like India where the problem of corneal disease is made so different by trachoma. Corneal surgery did not and will not wholly succeed on the basis of report in literature from countries without trachoma, because the approach to the problem has to be conditioned to the altered pathology and aetiology.

Still more recently, clinical experience from successful keratectomy have further added to the scope of corneal surgery in trachomatous eyes, and contributed towards greater optimism and better prognosis. It is now well known that even upto 1/3 to 1/2 of the thickness of the whole corneal surface can be shaved off without replacing it by a lamellar graft, and yet the remaining cornea will not only quickly epithelise but also remain transparent so that even conditions like chemical burns and symblepharon are also within the scope of corneal surgery.

Donor Material

We are still in a situation that only a human eye removed within 4 to 6 hours after death can be used for the penetrating type of corneal transplant. Heterogenous grafts from animals have been tried ever since the 18th century without any lasting success, because of the invariable immunological reactions. Experiments are however being made to try if a plastic shield could be used as a synthetic cornea in place of a donor human material, which could be placed inside the corneal tissue after a partial penetrating removal of the central portion of the opaque recipient cornea. This plastic material will obviously be free from all immunological reactions but it is still being tried in animals where, surprisingly enough, these plastic plates have remained *in situ* and clear for even upto three years. Human cornea however appears at the moment a different biological creation of nature but if the animal experiments become applicable to human beings, the answer to this most difficult proposition of corneal surgery will have been obtained.

Preservation of Donor Eyes (Eye Bank)

As already stated, the donor cornea must be used within 4 to 6 days of the removal of the eye for cases of penetrating keratoplasty. Because of this, the transplantation of ocular tissues has become very much restricted. The limitations are still further exaggerated because of the paucity of the suitable donor material, particularly in countries like India where the scope of corneal grafting is very great indeed. Every effort should, therefore, be made to collect and preserve this most valuable tissue whenever available.

Extensive researches are in progress to find out the most suitable method of preservation of donor eyes (King and Chavan, 1959). It is now considered possible that the corneas stored at 79°C in CO_2 snow could be used for lamellar grafting even after six months storage (Eastcott *et al*, 1954 ; Ormsby and Basu, 1957). Similarly, it is now feasible to use the corneas stored in glycerine and vacuum even after 18 months' preservation (King

1957 ; Cockram *et al*, 1959). The corneas under such conditions of storage are however nonviable and therefore unsuitable for penetrating keratoplasty where a living endothelium is necessary for the graft to remain transparent and visually useful. Much of these observations however await further investigations before they are accepted for wider clinical application. Moreover, results of these studies may not be equally successfully applicable in India with different ophthalmic problems. A suitable method of preserving eyes in Indian conditions is therefore a useful subject for research.

A regional eye-bank is presently being organised at Indore for collecting, preserving and using the donor material received from the city and district hospitals within a 4 to 6 hours transport distance. Similar regional eye-banks could be organised every 200 miles and thus provide adequate donor material for the various corneal surgery units. It is here that the cooperation of the general medical profession could be invaluable in the coordination and organisation of successful corneal surgery units and regional eye-banks.

Choice of Surgery

Antagonists and pessimists of corneal surgery have always shielded themselves behind the failures of others. It is no longer true, as believed by many in this country, that penetrating keratoplasty is the only surgical procedure worth the attempt and expected success. Table 2 indicates some of the commonly practised corneal procedures in a classified outline.

Table 2—Showing Common Corneal Procedures

Operations	Types and subtypes	
I. Keratoplasty	A. Penetrating keratoplasty	(a) Total
		(b) Partial
	B. Lamellar keratoplasty	(a) Total
		(b) Partial
		(i) Central
		(ii) Peripheral
		(iii) Circular
	C. Mushroom keratoplasty (penetrating with lamellar)	
	D. Plastic corneal implantation	
II. Keratectomy (with or without conjunctival flap)		

As stated earlier, trachoma is a disease affecting mainly the anterior 1/3 of the corneal thickness, unless it is complicated by perforation. Again donor material for a lamellar graft can be used from a preserved eye, weeks or even months after enucleation, because the donor lamellar graft does not carry with it the endothelial layer which forms the integral part of a penetrating graft. Lamellar keratoplasty is therefore a very safe procedure and one which should be more often practised than hitherto. Lamellar keratoplasty could be appropriately compared with extracapsular extraction in contrast with penetrating keratoplasty with an intracapsular extraction.

Another useful procedure that may have a wider scope in circumstances when a donor material for replacement is not available is keratectomy. It has been observed (Castroviejo, 1932) that up to the anterior half the corneal thickness could be shaved off and left to heal spontaneously. The remaining raw surface of the cornea will not only completely epithelise in about a week's time but will also remain clear to give vision upto 6/60 or even better. Keratectomy could thus be a practical means of corneal surgery in a country like India with trachomatous eyes having pathology largely limited to the anterior thickness of the corneal tissue.

A case has been reported (Maumenee, 1960) where a herpetic cornea after a superficial lamellar keratectomy was covered with a very thin conjunctival flap. The patient refused further surgery of penetrating keratoplasty because he not only became symptomfree with the first surgery but could even see 3/60 through the conjunctiva-covered cornea. This procedure could therefore be a very useful method of treatment in a trachomatous country like India.

Corneal surgery, with its scope for extensive clinical application in India has, of course, its limitations. Trachoma as the principal aetiological factor in the majority of cases for corneal surgery, deserves consideration and the limitations, if any, it places on its success can only be assessed after surgical experience of a few years in these new circumstances.

Paucity of the donor material is a problem that has been exaggerated by the less enthusiastic workers. One has, in fact, during his visit to U.S.A. very frequently to answer the common question, "How will you get the donor material in view of the serious religious prejudices prevalent in India?". Any big hospital in India can provide adequate number of eyes for keratoplasty even to the extent of 50 or over per year and the number can be appreciably augmented with the cooperation of the district hospitals near about.

With the above concepts, a regional eye-bank and a corneal surgery unit has been organised in the M. Y. Hospital of the M. G. M. Medical College, Indore, and in the first three months of its initial phase, 17 eyes have become available as suitable donor material. Corneas of these eyes have in most cases been used for either a pene-

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trating or lamellar keratoplasty. After removal of the donor graft, the transparent lens is removed with an intracapsular forceps with special interest to study the dynamics of the intracapsular cataract surgery in relation to the resistance of the suspensory ligament and the changes in the hyaloid fossa thereafter. The fluid part of the vitreous is then aspirated through a thick bored needle in a dry sterile syringe. This vitreous is transferred to a dry bulb for preservation and subsequent use for vitreous transplantation in cases of perforating injuries, exigencies during cataract surgery and retinal detachment operations. It has been reported that the vitreous can be preserved for a period upto 18 months (Basu, 1954).

Summary

This paper is primarily intended to arouse more scientific interest in this subject among the general medical practitioners in India and at the same time undo the unscientific impressions communicated through the general press. It was a surprise to the author that months after an eye surgeon from a foreign country had come and done a few keratoplasties with the donor material flown from an eye bank in U.S.A., a question is being asked by persons including medical practitioners if that surgeon had performed whole eyeball transplantations. And every one of the general practitioners has to answer if the phthisical and staphylomatous eyes could be replaced by the eye of a dead person! The present psition in that transplantation of the entire eyeball has not yet become a practicable proposition even in experimental animals, leave aside the human beings.

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ONE WORLD HEALTH AND INTERNATIONALISM IN HEALTH

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Introductory

The international interest in the promotion of health is based on the philosophy enunciated by the World Health Organisation (WHO) that health is "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity"—an ideology accepted today by all the welfare States. Health, is indivisible and it is in each country's interest that the peoples of other countries should live in healthy conditions. With this end in view the majority of the nations of the world are already working together under WHO. In the opening session of the Fifth International Congress on Nutrition in Washington on September 2, 1960 President Eisenhower observed that "if history, which will one day view the events of this period in perspective, could only say that at this moment the world began truly to take the high road of health and plenty leading towards peace leaving for ever the path of strife and anxiety, then indeed our great-grandchildren would call this the brightest era of all times" (Reuter, 1960).

Dr. Radhakrishnan, when he visited the United States in November 1960 observed: "If we are to make the world a safe place and if humanity is to emerge in the future into some sort of solidarity, it must come from the hearts and minds of men". He added that in the modern world no nation should regard itself as living for itself alone, but rather nations must live for all humanity. He called upon mankind "to set aside the differences caused by accidents of geography and history and accept the universal ideas transmitted by a common heritage" (*American Reporter*, 1960).

It would not be out of place here to make a reference to the aims and objects of two of the international bodies, the United Nations Educational, Scientific and Cultural Organisation (UNESCO), and the World Health Organisation. With special reference to the needs of the underdeveloped countries UNESCO has formulated a constructive philosophy of "fundamental education" in consonance with the ideal that "the aim of all education is to help men and women to live fuller and happier lives in adjustment with their changing environment, to develop the best

elements in their own culture, and to achieve the social and economic progress which will enable them to take their place in the modern world and to live together in peace" (UNESCO, 1949).

The preamble to the constitution of WHO states, "The enjoyment of the highest attainable standard of health is one of the fundamental rights of every human being without distinction of race, religion, political belief, economic or social condition ..... The health of all peoples is fundamental to the attainment of peace and security and is dependent upon the fullest co-operation of individuals and States ..... The achievement of any State in the promotion and protection of health is of value to all ..... Unequal development in different countries in the promotion of health and control of disease, especially communicable disease, is a common danger" (WHO, 1957).

It may be pointed out here that six pandemics of cholera during the nineteenth century had their origin in India, and the second (1826-37), fourth (1866-70) and sixth (1892-95) of these spread north-westerly from Hardwar pilgrims to Punjab and then by the overland route to Afghanistan, Persia, Southern Russia, and finally invaded both Europe and America (WU Lien-Teh *et al*, 1934). The 1957 pandemic of Asiatic influenza which started from Northern China is recent example of how a communicable disease can affect several countries in a very short time unless prompt international measures are taken to notify and control the disease on a world-wide scale. This epidemic started in the north of China at the beginning of the spring and penetrated into the interior of the country, and the virus was isolated for the first time at Peking, in March 1957. The disease probably began at the end of February that year in a limited area in Kweichow province between Kweiyang and Kutsing (in Yunan province). In early March it spread to Yunan province and by the middle of March it spread all over China. Cases next appeared at Hong Kong in the middle of April, when for the first time it was recognised as an epidemic threat to other countries. During May, June and July, the epidemic spread very rapidly to the Philippines and Japan, South-East Asia, and the Western Pacific ; then to India, the Persian Gulf, Iran, Yemen, Aden, the Sudan, Egypt, Syria and Jordan. And soon it spread to Europe, North and South America, Australia, New Zealand and South Africa. By the end of the year the virus was seeded in practically in all countries.

It is this concept of "one-world health" which is reflected today in the discussions and actions of the various professional bodies. The World Medical Association laid down an international code of medical ethics in October, 1949, and had adopted the Declaration of Geneva in September, 1948. The first World Conference on Medical Education met in London in 1953. International medical conferences on various specialities have become a regular feature in the post-war years. It is significant to note that the *American Journal of Public Health and the Nation's Health* (1960) had a special supplement issued on 'Public Health Is One World', which was the theme for its 87th annual meeting in 1959 at which public health scientists from thirty-two other countries had joined. In the words of Baumgartner (1960) "This was the first world-wide workshop in public health in seeking ways to improve the health of all, sponsored by a non-governmental agency. . . . In our approach to global problems, we scientists in public health have a tremendous advantage over politicians and diplomats. The politicians and diplomats of different nations must always seek either to reconcile their differences or to gain advantage over their fellows. For those in medicine and public health no one can and certainly no one desires to gain a mere national or ideologic advantage ; the common enemy is always disease, disability and suffering". "World Health" is the subject of a book by Brockington (1958). A magazine entitled *World Health* is published every two months by the World Health Organisation.

Internationalism in Health

A little over one hundred years ago, in 1851, the first attempt was made to reach international agreement on a health matter. The subject was quarantine and the occasion was the first International Sanitary Conference held in Paris, which was attended by representatives of 12 European States. What is quarantine? 'Quarantine' is derived from 'qudranginta' meaning forty. As early 1383 Marseilles passed the Quarantine Law and established the first quarantine station to enforce forty days' detention period for vessels entering the port (Bolduan and Bolduan, 1949).

The next internationalism in health came through the International Red Cross, a voluntary organisation. Henri Dunant, a citizen of Switzerland, was the first to conceive the idea of having an organisation which could render succour to the suffering humanity irrespective of caste, creed or nationality. The harrowing tales of the battle of Solfarino in Northern Italy in 1859 created a deep impression and stirred him to arouse the conscience of the world. And thus was born the Red Cross in 1864. It was the earliest and largest single

organisation dedicated to the humanitarian task of promoting health, preventing disease and rendering help to those in distress. Eighty-two nations are wedded to the ideals of the Red Cross. Its Geneva Convention is still the greatest hope for the sick, wounded and captured prisoners of war. Today the Red Cross has become a symbol of man's solidarity, hope and faith in its struggle for peace, prosperity and brotherhood all over the world.

Regional International Bodies

The Pan American Sanitary Bureau, established in 1902, was the earliest international organisation in the health field. It was primarily intended to co-ordinate quarantine procedures in the American hemisphere. In 1949 an agreement was signed between WHO and the Bureau designating the Bureau as the Regional Office of WHO.

Next to come into being was L'Office Internationale d'Hygiene Publique in 1909 in Paris as a result of the growing need for a permanent international health organisation. The aims of this organisation were to receive notification of such diseases as plague, cholera, smallpox, typhus and yellow fever from participating nations and to transmit this information to the member nations (through diplomatic channels). It continued to function until it was absorbed by WHO in 1947 (Maxcy, 1956).

Rockefeller Foundation and Growth of Internationalism in Health

The Rockefeller Foundation, a voluntary organisation, chartered "to promote the well-being of mankind throughout the world", established in 1913 an International Health Commission which replaced the Rockefeller Sanitary Commission formed in 1909. The International Health Commission was subsequently changed to International Health Division of the Foundation. The Rockefeller Foundation, organised in 1913, was to a considerable extent an outgrowth of the Rockefeller Sanitary Commission which had been started four years earlier, and, as a result of this initial orientation, the activities of the Rockefeller Foundation were for many years thereafter largely concentrated in the fields of public health and medicine. Other Divisions added since 1929 are Biological and Medical Research, Agriculture, Social Sciences and the Humanities. There was also a Division of Medical Sciences which supported the programme of medical education. The International Health Division and the Division of Medical Sciences were combined as the Division of Medical Education and Public Health. The two interrelated fields of interest, Biological and Medical Research, and Medical Education and Public Health, were united into one programme in 1959, the Medical and Natural Sciences, which now includes the interests of the Foundation in both research and teaching in medicine, biology, and public health (The Rockefeller Foundation, 1958 and 1959).

The International Health Division (1) developed demonstration health projects such as the Partapgarh Health Unit, the first health unit in Uttar Pradesh, opened on 18th July, 1932, (2) opened training centres for public health personnel in various countries, (3) provided fellowships, and (4) supported basic research in governmental, non-governmental and Foundation laboratories for developing effective methods of control of malaria and yellow fever. It may be mentioned that the Rockefeller Institute for Medical Research, New York, was organised in 1901. An international campaign for the control of hookworm disease was initiated by the Rockefeller Foundation nearly 50 years ago (Winslow, 1957). The work of the Rockefeller Foundation in India began in Madras Presidency in 1920 with hookworm studies and control measures (Balfour, 1956).

The following words from the President's review in the annual report of the Foundation for 1957 may be aptly quoted: "The work of the Rockefeller Foundation has brought it into close contact with inter-governmental cooperation at the local level in every continent. From what men do, as well as from what they say, one cannot doubt that disease, hunger and ignorance are everywhere looked upon as great affronts to human dignity. One senses that health, a decent livelihood, and education are common interests which help to transform contentious men into natural allies. If, in the shadow of terror, we are well advised to act at least in some particulars as *homo sapiens*, there are many opportunities" (The Rockefeller Foundation, 1957).

Health Organisation of the League of Nations—the First International Organisation for Health

Winslow (*loc. cit.*) observes: "The next important step in the development of a programme of world health—and one of primary importance—was taken in 1923 by the establishment of the Health Organisation of the League of Nations. This was the first attempt to create a strong and effective official machinery for continuing attack on the problems of disease on a world scale". Its general advisory health council was made up of representatives of some 50 governments. Its

functions were: (1) epidemic intelligence service (epidemic disease notification without going through diplomatic channels) with an office in the central headquarters at Geneva and an eastern bureau at Singapore, (2) consultation service by providing expert committees and commissions on malaria, smallpox, leprosy, syphilis, etc., established to carry on research and planning for the control of these diseases, (3) international biological standardisation under which two commissions on biological and drug standardisation were established in 1935, (4) education and training in the health field by establishing a library and developing a fellowship programme, and (5) research on infectious and epidemic diseases, nutrition, health administration, etc. (Maxcy, 1956).

Winslow (*loc. cit.*) further states: "As regards direct service to individual nations, the Health Organisation of the League of Nations (in cooperation with the Rockefeller Foundation and other bodies) rendered invaluable aid in the control of post-war typhus fever in Poland and Roumania, in the control of malaria in Albania, Greece, Thailand, and Yugoslavia, in the development of a health programme for China, in the conduct of health demonstrations in Czechoslovakia, in the improvement of sanitary conditions in Bolivia, in syphilis control in Bulgaria, in anti-cholera measures in Shanghai, and in infant-mortality programmes in Belgium, France, and the Netherlands".

Post-War Internationalism in Health

The Health Organisation developed between the two World Wars had failed, and only the International Red Cross was working in the Second World War. At the suggestion of the United States in 1943, forty-four nations met and set up the United Nations Relief and Rehabilitation Administration (UNRRA) for large scale emergency operation to cope with the human and economic devastation of war-torn areas. Each uninvaded nation pledged 1 per cent of its national income, creating an initial fund of nearly two million dollars, to be used in devastated countries for relief of suffering, rehabilitating medical and health services, providing medical supplies and controlling epidemics. The handling of displaced persons and protection of their health were important activities of this organisation. UNRRA was also responsible for initiating plans for an international health conference, which was held in New York in June-July 1946. At this conference the constitution of the World Health Organisation was drafted. Five and a half years after its birth UNRRA was disbanded and its long term functions were taken over by other U. N. agencies (UN, 1960).

The World Health Organisation

When the United Nations charter was drawn up at the San Francisco conference in 1945, it was recognised that there should be an international health organisation. A year later the international health conference in New York, held from June 19 to July 22, 1946, drafted a constitution for the World Health Organisation of the United Nations which was signed on 22nd July, 1946 by the representatives of 61 States participating. The constitution came into force on 7th April, 1948. April 7th is now celebrated throughout the world as 'World Health Day'—a day for reviewing man's achievements in his war against sickness and for re-dedication to the cause of bringing good health to all people everywhere. In 1960 the World Health Organisation had 90 members and 11 associate members contributing about 17 million dollars. The first ten years of WHO are reviewed in a book (WHO, 1958).

World Health Organisation represents the culmination of efforts to establish a single intergovernmental health agency. It inherited the functions of three antecedent international organisations, viz., L'Office Internationale d'Hygiene Publique, the Health Organisation of the League of Nations and the Health Division of UNRRA.

World Health Organisation is one of the specialised agencies of the United Nations. It plans and coordinates international campaign for better health. It acts as a clearing house for medical and scientific information and sets international standards for drugs and vaccines. It organises international training courses, sponsors the work of technical committees on poblems ranging from specific vaccines to the care of the aged, maintains an epidemic-warning service and in general plans the global strategy for combating mass communicable diseases (UN, 1960). It has six regional organisations one of which, established in 1949 for the South-East Asia Region, has its headquarters at Delhi. Its members are Afghanistan, Burma, Ceylon, India, Indonesia, Nepal and Thailand.

It is for the first time that an international concept of positive health has been adopted, and agreed to be aimed at, by co-operative efforts through an international organisation—the WHO. This is a unique achievement for mankind. Health to-day is a subject in the achievement of which there is maximum understanding and co-operation among the nations. Further, the health problems of those countries whose annual per

capita income does not exceed 100 dollars will receive special attention of WHO.

Advisory and technical services are the two arms of WHO for helping governments to break the vicious circle "Sickness—breeds—poverty—breeds—sickness". Through WHO's advisory services underdeveloped countries are provided, on request, with consultants, teachers, and demonstration teams consisting of a number of highly trained and experienced specialists. The WHO technical services are the fact-gathering arms of the Organisation. Since 1952, WHO is also running an international warning system of epidemic intelligence—a daily service through a world-wide chain of radio transmitters by which cases of plague, cholera, smallpox and other epidemic diseases anywhere in the world are reported to the Organisation. These are compiled by WHO and the news is transmitted to all nations by air.

Other United Nations Agencies

In addition to WHO there are other United Nations agencies which are helping to build a better health among the nations. These are (1) the United Nations Emergency Children's Fund (UNICEF), (2) the Food and Agriculture Organisation of the United Nations (FAO), (3) the International Labour Organisation (ILO), and (4) the United Nations Educational, Scientific and Cultural Organisation (UNESCO).

1. The *United Nations Children's Emergency Fund* was established in 1946 on a temporary basis, but later events and needs turned it into a permanent body which has come to be known as UNICEF. It was initially concerned with supplementary feeding of children in war devastated areas. Later the organisation extended its field of operation to other countries and to programmes stressing child health and maternal and child care. It aids in establishment of basic maternal and child health services (e.g. the Primary Health Centres in India), in campaigns to control or eradicate diseases (e.g. trachoma, tuberculosis and yaws) affecting large number of children, in educating families in better nutritional practices, and in emergency relief for children and mothers at times of natural disaster.

2. *FAO*, a specialised agency of the United Nations, came into being in October, 1945 to cope with the serious situation which had developed after the Second World War. The experts of FAO set target goals of an increase of 90 per cent in the caloric yield of the less-developed areas by 1960, an increase which could not only provide for probable population growth but also for a material rise in standards of living (Winslow *loc. cit.*). FAO carries out a "World Agriculture Intelligence Service" to find out what food the world is producing and to estimate future needs. Its secretariat has six divisions, viz., agriculture, economics, marketing and statistics, forestry, fisheries, nutrition and rural welfare (Goodman, 1952). In 1960, it had 78 members and 9 associate members. Its present director-general is Mr. B. R. Sen from India. FAO, UNICEF and WHO are collaborating on an expanded nutrition programme in some States in India.

3. The *International Labour Organisation* created in 1919 was the only affiliated body of the League of Nations which moved intact into the UN structure. It is a specialised agency of the United Nations with a membership of 83 (in 1960). It has developed a 'world labour code'. It is interested in the welfare of workers, including health of the labourers, especially the factory workers, all over the world.

4. *UNESCO* is a specialised agency of the United Nations with a membership of 82 and 6 associates (in 1960). It is working since 1946. It coordinates the work of educators, social scientists, humanists, natural scientists, writers, etc. through meetings, information clearing houses and missions in the field. It also works to strengthen international understanding by broadening public knowledge of various cultures. It helps to develop mass communication services and removes barriers to the international flow of information.

Winslow (*loc. cit.*) writing on the importance of a broad and integrated programme on health observes: "The importance of economic and social factors in the health and welfare of our peoples does not weaken—but strengthens—the argument for a comprehensive programme for world health. On the other hand, the inter-relationships involved make it abundantly clear that the public-health programme cannot be planned in a vacuum, but only as a vital part of a broader programme of social improvement. In this programme the public-health worker must work in the closest and most intimate contact with the United Nations, its constituents and co-operating bodies (such as the Department of Social Affairs, and the Economic and Social Council), with FAO, ILO, UNESCO, UNICEF, non-governmental organisations, and other similar groups." He further quotes Farnsworth who observed in a report that "The entire success of any public-health programme is dependent on the concurrent and integrated approach to the social, educational, and economic problems within the area. Improvement in health will automatically follow improvement in the educational, economic, and

social status of the people." Mobilisation of all the effective individual agencies and programmes of the area into one local generalised practical programme should be the ultimate objective, as is being done through an integrated approach in the community development projects in India. Economic development and public health are inseparable and complementary and the social, cultural and economic development of a community and its state of health are interdependent.

Other International Programmes

The Colombo Plan—At a meeting of the Commonwealth Foreign Ministers at Colombo in 1950, a carefully planned programme for South-East Asia was drawn up. Eighteen per cent of the budget of about Rs. 25,000 million of this programme was for health. Three-quarters of the total budget was allotted for India (Winslow, *loc. cit*).

The Point Four Programme—The U.S.A. programme referred to as the 'Point Four' programme has this name because the proposal in President Truman's 1949 address happened to be so numbered. In this programme provision is made for extensive technical assistance to under-developed countries for the development of their health programmes. This programme is administered by the Department of State and the Economic Co-operation Administration and in India by the Technical Co-operation Mission (TCM) which is assisting the National Malaria Eradication and the National Filaria Control Programme with laboratory equipment, insecticides, drugs and transport.

The Ford Foundation—The Ford Foundation awards grants to institutions for international training and research and educational and cultural development. It has established three orientation training centres for health workers in community development projects at Nazafgarh, Singur and Poonamallee and also the research-*cum*-action project at these places for evaluation of the environmental sanitation studies. The Foundation has three main interests in improving the health in India :

1. Improvement of health through better environmental sanitation including the training of sanitary inspectors,
2. Improvement of health through better rural health administration, and
3. Family planning—Experience on family planning through a number of pilot family planning communication research centres in India.

The Nuffield Foundation—The Nuffield Foundation was started in 1943 with the benefaction of £10,000,000 from Lord Nuffield. Its income from investments, running to some £700,000 a year, is used for the prevention and cure of illness, for helping less well off people—especially the aged poor—to live more comfortably and happily, for medical research, and for travelling scholarships. The whole Commonwealth comes under the scope of the Nuffield Foundation.

Conclusion

It will be seen from this review that we have come a long way from the concept of the 'forty days' of quarantine. Indeed the sponsors of the first international conference of 1851 never dreamed that within one hundred years there would come a comprehensive network of international agencies. Even so we are only at the beginning of a long struggle to overcome ignorance, poverty and disease but we have the advantage over our forefathers that we can already visualise 'One-World Health'.

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PUBLIC HEALTH

POSTOPERATIVE TETANUS

A Study of Possible Sources of Infection

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Tetanus as a hospital infection is rare. Cross infection from case to case never occurs (Williams *et al*, 1960). Most wounds are not suitable for *Cl. tetani* to thrive. Some of the materials used in the operation theatre are likely to contain *Cl. tetani* spores. The Public Health Laboratory Service of United Kingdom (1959) reported the presence of spores in several batches of cotton wool and gauze. The investigators suggested that every attempt should be made to prevent the entry of spores into the theatre through air, dust, dressings or in other ways. Hills (1946) reported isolation of *Cl. tetani* from talc used by the surgeons before putting on gloves. Lowbury and Lilly (1958) reported contamination of operation theatre air with *Cl. tetani* spores. Robinson, McLeod and Downie (1946) reported that dust in the operating theatre can be a source of tetanus. Murray and Denton (1949) reported that plaster of paris can also be a source of tetanus and gas gangrene. Welch, Slocum and Herwick (1942) reported isolation of *Cl. tetani* from sulphonamide dusting powder. Sevitt (1949) investigated the source infection when two postoperative cases of tetanus occurred in a hospital. He showed that building materials used in the hospital for some repairs near the operation theatre during this period contained *Cl. tetani* spores. He also found the spores in various parts of the theatre which was attributed to dissemination from the building material through air and dust. Further in this connection it was shown that talc used by the surgeon contained the spores which were not killed during sterilisation presumably due to tight packing of the bins. It might as well be that the talc was contaminated from the spore-laden dust in the theatre.

We undertook an investigation into the possible sources of tetanus infection when cases of tetanus occurred after surgical operations in a local hospital.

MATERIAL AND METHODS

When the investigation was started, only one of the cases (a vaginal hysterectomy case) was alive. Exudate in the vagina was collected by a swab. Swabs were also taken from various places in the operating theatres and wards, including the places where linen of the theatre and wards is laid out for drying. Swabs from the syringes used in the wards, dressing materials from the theatres and wards, and suturing materials such as catgut and silk were also examined (Table 1).

The suturing material was examined according to the method prescribed in the Therapeutic Substances Regulation Act (Mackie And McCarteny, 1959). All other materials were inoculated in Robertson's cooked meat medium and Brewer's thioglycollate medium and incubated at 37°C. Stained films from the cultures were examined after 48 and 96 hours. Those showing organisms morphologically resembling *Cl. tetani* were selected and a little of the medium was taken into a sterile tube and heated at 65°C. for 30 minutes to destroy the non-sporing organisms. A drop was then inoculated in the water of condensation in a Fielde's agar slope and incubated anaerobically at 37°C. When the thin spreading growth at the top of the slope was seen, it was subcultured in Robertson's medium and incubated at 37°C. for 4 days. This procedure was repeated a few times and then the heated culture was plated on nutrient agar and incubated anaerobically. Subcultures from the thin film of spreading growth into broth yielded a pure culture, on anaerobic incubation. This was tested for absence of fermentation of carbohydrates and for indole production. All such cultures which were indole positive and showed no saccharolytic activity were tested for pathogenicity on white mice. The culture was inoculated subcutaneously in 0·2 ml. doses into a pair of mice one of which was protected by intraperitoneal injection of 100 units of tetanus antitoxin, the previous day.

RESULTS

The materials subjected to examination and the results obtained are shown in Table 1.

TABLE 1—SHOWING MATERIALS EXAMINED AND THE RESULTS OBTAINED

Materials examined	No. of specimens	Bacilli morphologically resembling *Cl. tetani*	
		No. positive	No. negative
1. Catgut of various batches	8	Nil	8
2. Silk	1	Nil	1
3. Dusting powder	1	Nil	1
4. Ether soap ...	1	Nil	1
5. Gauze, cotton (sterile)	3	Nil	3
6. Pieces of bed linen, etc, used by tetanus patient	6	1	5
7. Swabs from different places	36	21	15
8. Swabs from tetanus patient	1	1	Nil
9. Space outside the theatre used for drying linen	2	2	Nil
Total ...	59	25	34

Organisms morphologically resembling *Cl. tetani* were found in 25 specimens of different kinds. Out of these 9 were proved to be *Cl. tetani* by biochemical and pathogenicity tests. The specimens showing toxigenic *Cl. tetani* were:

1. Swab from operation table in theatre A.
2. Swab from floor of washing room of theatre A.
3. Swab from floor and walls of theatre BE.
4. Swab from floor and walls of theatre BW.
5. Swab from the place where theatre linen is laid out for drying.
6. Swab from walls and floor of "septic gynaecological" theatre.
7. Swab from prepration table of M.S.A. ward.
8. Swab from walls and floor of M.S.A., postoperative ward.
9. Swab from patient's vagina (hysterectomy).

It will be obvious that materials like suturing material and dressings were free from *Cl. tetani*. That is, the materials actually used on the patients during operation were not the sources of infection.

DISCUSSION

The investigations showed that *Cl. tetani* spores were present in several parts of the theatres and wards in this Hospital. A potential danger of developing postoperative tetanus exists when the spores are present in the theatre. The mere presence of the spores of *Cl. tetani* in the theatres and wards are not sufficient to explain the occurrence of tetanus. It is possible that the materials used on the patient, such as dressings, were contaminated by spores from the dust or air in the theatre. This could not be verified as the dressings, etc., used at the time of the incidence of the disease were discarded and the theatres were carbolised before the possible sources of infection were sought for.

Extensive building operations were going on in the hospital at the time of the investigation and dust was being thrown up constantly. This found its way into the theatres and wards and, spores were carried along with the dust into these places. Another interesting feature was the detection of the spores at the site where the theatre linen was laid out for drying. The linen was easily contaminated with the spores from that place. Minor surgical cases were treated as outpatients in this hospital. They walk to the hospital and are laid on the theatre table in their own clothes. Under the circumstances it is possible that clostridial spores were carried into the theatres with the dust on the feet of the patients and on their clothes and deposited there.

When *Cl. tetani* spores are present in the operation theatres and wards, materials such as dressings, gloves, talc, etc., are likely to be contaminated with the spores. A temporary fault in sterilisation such as tight packing of bins, may result in viable spores being left in the materials and can lead to infection. It is, however, very unfortunate that a vital link in the chain of events leading to infection was missed as materials such as dressings, talc, gloves, etc., could not be examined bacteriologically immediately after the occurrence of postoperative tetanus. It is possible that one or more of these things actually coming in contact with the operation wound contained the spores.

SUMMARY

A study of the possibile causes of postoperative tetanus in a local hospital showed that:

Spores of *Cl. tetani* were present in several places in the theatre, the place for drying theatre linen and in various situations in the surgical wards.

Suturing material was found to be free from spores.

The complete chain of events leading to infection in the cases could not be established.

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How infection might have occurred is discussed.

The literature on the subject is reviewed.

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CASE NOTES

DYSGERMINOMA

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INTRODUCTION

This tumour of the ovary is of interest due to its infrequency. There are less than 500 cases reported in the literature. Discussion has recently centred round its potential malignancy. Pick (1904), Wolfe and Kaminester (1935), Ewing (1940) believed that the cell of origin belongs to the sex cell series and arises from a totipotent cell close to the ovum, and Meyer (1931) postulated that the tumour is composed of undifferentiated cells similar to those seen in the stage of gonadal development. Though the histogenesis has now been agreed upon after the description given by Meyer (*loc. cit.*) of its origin from sexually undifferentiated cells, the potentiality of malignancy in a given tumour being uncertain, its treatment is far from being standardised. This has become more difficult since the number of cases followed up over a long period has not been large enough. Any individual surgeon's experience of this tumour is limited and therefore an effort to learn from the data collected from various reported cases only becomes possible (Potters, 1946; Mueller *et al*, 1950; Pedowitz and Grayzel, 1951) and justifies the report of four cases of dysgerminoma treated in a period of 5 years from 1954 to 1959.

CASE REPORTS

CASE 1—Mrs. Rajaboti, aged 25, was first seen on 28-3-54. She complained of acute pain in the abdomen of varying intensity and distension. This followed an abortion of twelve weeks' duration which took place 15 days previously. She was treated for this pain by massage of the abdomen. She had 2 full-term natural deliveries and the last was 4 years ago. The menarche was at 13 years and the menstrual history had been regular, for 3-4 days every 30 days and the last menstrual period was 14 weeks ago. On examination a large mobile and tender swelling was detected in the abdomen, anterior to the uterus. Free fluid was also present in the peritoneal cavity. Presence of fluid in the right pleural cavity was detected. The blood examination revealed haemoglobin 7·5 g./per cent and W.B.C. 21,000 per c.mm. A provisional diagnosis of twisted and infected ovarian cyst was made. A paracentesis was done and 30 oz. of clear fluid was removed from the peritoneal cavity and examined for malignancy, which was negative. The patient was given a transfusion of 600 ml. of blood in all and treatment was undertaken for anaemia. A tuberculous lesion of the right lung was suspected and a total of 30 g. of streptomycin was also given. An attempt at laparotomy for removal of the tumour was made on 24-8-54, but had to be given up for extensive adhesions. The patient left the hospital in October, 1954.

This lady was again admitted 4 months later on 20-2-55 in a very much improved state of general health, with a sinus in the previous scar which appeared a week ago. The track was not examined histologically. Her haemoglobin now was 13 g. per cent. The tumour was freely mobile. An abdominal operation was performed on 27-4-55. Adhesions were found around the sinus and with the omentum. No adhesion with the bowel wall was detected. A left salpingo-oophorectomy was thereafter performed. The right ovary and tube were normal. The wound healed up well but the general condition of the patient remained far from satisfactory. A marked anaemia developed and Hb. was 7·4 g. per cent. A blood transfusion was given with little improve-

ment. This prevented undertaking of radiotherapy. By the first week of June, bile pigments appeared in the urine which could not be definitely explained. The general condition of the patient was fast deteriorating. She left the hospital on 17-7-55 in a moribund state.

Pathological report (S/55-306) revealed dysgerminoma showing diminutive teratomatous changes.

CASE 2—Mrs. Ramdevi, aged 22, was first seen on 16-11-54. She complained of pain in the abdomen for four months and a swelling of six months' duration which was noticeably increasing in size. She was married for over ten years and had 3 full-term natural deliveries. The last child was one year old. The menarche was at 15 years and the menstrual history had been regular, for 5 days every 30 days. The date of last menstrual period was not definitely mentioned.

On examination a swelling in the abdomen of the size of 20 weeks pregnancy, mobile, irregular in shape, displacing the uterus posteriorly was detected. The cervix appeared congested and the uterine sound was passed to a length of five inches, in order to confirm the relationship of the uterus with the tumour. The haemoglobin was 14·6 g. per cent and R.B.C. count was 4·5 million per c.mm. The total white cell and differential counts were within normal limits. On 25-11-54 a total hysterectomy with bilateral salpingo-oophorectomy was performed. The pedicle was found to be thick and twisted. The postoperative course was uneventful. On 29-12-54, 3000 *r* of deep x-rays was given after confirming the diagnosis. The patient left the hospital in January 1955. Since then, regular follow-up revealed that there was no recurrence, or symptoms until 1-8-59.

Pathological report (S/54-797): Macroscopically the specimen showed the following features:

1. The left ovary showed a well-encapsulated greyish white tumour measuring 13 cm. × 12·8 cm. × 7·2 cm. The surface was lobulated. The consistency was like that of rubber and not firm. The cut surface was more or less homogeneous and lobules were separated by thin fibrous septa. There were yellowish areas of necrosis of varying sizes, which were irregularly scattered on the cut surface.

2. The right ovary showed corpus luteum of pregnancy.

3. The uterus was enlarged to the size of 8 cm. × 6·5 cm. × 4 cm.

Histological sections from four paraffin blocks prepared from different representative areas, showed similar structure. The tumour cells which were large, round, with lightly stained cytoplasm containing large nuclei with a prominent nucleolus, were arranged in alveolar pattern separated by fibrous septa. There was variable degree of lymphocytic infiltration of the fibrous stroma. At places, the tumour showed wide areas of necrosis.

Diagnosis—The case was diagnosed as classical dysgerminoma of the right ovary, with a 4 months old pregnancy (in uterus) and corpus luteum in the left ovary.

CASE 3—Mrs. Ramrati, aged 16, was seen on 23-5-55. She complained of pain and swelling in the abdomen for four months, and a sensation of a choking now and then. She was married for one year and had no pregnancy. The menarche was at 15 years, and the menstrual history had been regular, 4-5 days every 28 days. The last menstrual period was a few days back. She suffered from dysmenorrhoea for the last two periods.

On examination a swelling of the size of 26 weeks' pregnancy was detected which displaced the uterus to the left and posteriorly. It was firm and mobile. A blood examination showed the Hb. value, R.B.C. and W.B.C. counts to be within normal limits. On 26-5-55 the abdomen was opened and right salpingo-oophorectomy was performed. The vascularity of the pedicle was noticeable. The uterus was found to be of normal size. The postoperative course was uneventful and she left the hospital on 7-6-55. She was seen again in February 1956 in 26th week of pregnancy which was progressing normally.

Pathological report (S/55-393)—The section showed classical dysgerminoma of the ovary. It also showed corpus luteum of pregnancy.

CASE 4—Mrs. Shanti, aged 20, was seen on 30-3-59. She complained of continuous dull pain and a swelling in the abdomen for a period of one year, and inability to use her lower limbs for one month. This was noticed soon after the last confinement. She had 2 full-term natural deliveries and both the issues died soon after birth. The menarche was at 14 years and the menstrual history had been regular, 3-4 days every 30 days, previous to the last confinement. She had at present lactational amenorrhoea. Besides this she suffered from incontinence of urine and stools.

She was diagnosed as a case of transverse myelitis with an ovarian tumour. The cause of transverse myelitis cannot be explained.

On examination a swelling of the size of 20 weeks' pregnancy was detected in the right fornix. The uterus was of normal size and the left fornix was normal. It was hard, well defined and freely mobile. There was evidence of free fluid within the abdomen. An enlargement of the spleen to

2½ fingers breadth below the costal margin was detected. A blood examination revealed Hb. 8 g. per cent and total R.B.C. count of 3·5 million/c.mm. The other readings were normal. On 6-4-59 right salpingo-oophorectomy was performed. At the operation a twist was found in the pedicle which had congested blood vessels also. The adnexa on the other side were normal. The post-operative course was uneventful. Her paraplegia persisted and she was transferred to the medical section on 17-4-59.

Pathological report (S/59-406)—The size of the tumour was 17 cm. × 15 cm. × 12 cm. It was solid, well encapsulated and lobulated. The cut surface was yellowish, somewhat friable, homogeneous and bulged at its cut surface.

Microscopic appearance revealed classical dysgerminoma of the ovary.

Discussions

The incidence of dysgerminoma has been variously reported. The largest series of 427 cases was reported by Mueller *et al* (1950). Since then cases have been reported in small or large numbers now and then by Cowan *et al* (1953), Mathieu and Planchu (1950), Blocksma (1955). Looker *et al* (1953) reported 5 cases in 1956 and Purandare and Patwardhan (1955) reported 6 cases in a 12 year study of 69 malignant tumours of the ovary. The four cases reported here were seen in a period of 5 years (1955-59). Their ages were 16, 20, 22 and 24 years. Mueller *et al* (1950) mentions 10-30 years as being the age group showing the largest incidence (73 per cent). The number of cases were found to lessen with advancing age. Over the age of 30 pseudo-hermaphrodites have contributed a large number of these tumours (Wills, 1953). None of the patients reported showed any variation in the menstrual cycle or manifested any disturbed hormonal balance clinically. This is in keeping with the neutral character of the cells participating in the formation of this tumour (Meyer, 1931). Underdevelopment, hirsutism and pseudo-hermaphroditism have been reported by Novak and Gray (1938), Long *et al* (1941), and Mathieu and Planchu (1950) in their cases.

In one case the tumour was noticed after an abortion. Two cases noticed it after a normal confinement, while the fourth case noticed it developing and wondered if it was a pregnancy having been anxious for a child (she had actually a pregnancy after the removal of the tumour). This association with pregnancy has been mentioned by Pedowitz and Grayzel (1951) but was not seen by them.

A twist in the pedicle was seen clearly in two of our cases, while in another it could not be definitely said to be absent. Twisting of the pedicle was seen in 5 per cent of the cases in Mueller's series. In all these cases the tumour was unilateral. The bilateral incidence in this variety of ovarian tumour has been variously quoted. Pedowitz and Grayzel (1951) mentioned it as 2 in 17 cases (11 per cent), while Mueller *et al* (1950) found it in 14·6 per cent in his 427 cases. Seeger (1938), however, stated it to be 26 per cent and Barzilai (1948) described it as a frequently bilateral tumour. There is no special predilection for these tumours to occur on one or the other side. They are equally distributed on either side, and in our four cases also two were found on the right and two on the left side.

Pleural effusion was noticed in one of these cases. This was diagnosed as tuberculous on clinical evidence. The association of a tuberculous focus has been mentioned in 10 out of 427 cases of Mueller's series. Giant cells, similar to those found in tuberculous lesions in the areas of degeneration, have been described by Schiller (1934). A significant association of this disease however has not been seen so far.

The treatment to be adoped in these cases has been the subject of discussion. In the cases presented here, the limited surgery of a unilateral salpingo-oophorectomy when adopted, was more through failure to surmise a correct diagnosis of the pathology of the tumour than as an outcome of a definite view. In only one of the cases was the clinical appearance very suspicious of malignancy due to bilateral enlargement. In this case a radical removal followed by radiation was undertaken as the treatment. Simple salpingo-oophorectomy for a mobile tumour has been suggested by Novak (1952) and Hendall and Hall (1952) and a plea has also been made by Pedowitz and Grayzel (1951) to consider a possible restricted surgery. Since the degree of malignancy may be difficult to gauge even after histological examination, the decision for a radical surgery has been advocated by various authors (Barzilai, 1949; Henderson, 1951; Pedowitz and Grayzel, 1951).

The clinical factors that suggest further course of the disease have been hinted by Pedowitz and Grayzel (1951). A bilateral involvement, presence of ascites, bursting of capsule, presence of teratomatous and chorio-carcinomatous elements in histopathological sections and presence of metastases are accepted to be influencing the prognosis adversely.

In comparatively younger patients in the child-bearing age especially when they are nulliparous, it is necessary to be guided by clinical factors. In the present group the usefulness of the above mentioned points before undertaking radical surgery has been proved.

In two of our four cases the tumour was well encapsulated and mobile and conservative attitude in treatment was adopted. One has had a full-term pregnancy a year before the treatment and the last one is being followed in her pregnancy after the operation. It is observed that if there is no metastasis after one year, the prognosis is materially improved (Mueller *et al*, 1902). This will be verified as years pass by.

A regular follow-up alone in the cases treated conservatively will guide us in the treatment of suspected cases. Pedowitz and Grayzel (1951) reported 52·9 per cent recovery in encapsulated cases, but in our group Case 1 had clinically ascites and bursting of the capsule, and Case 2 had bilateral tumours. Both warranted radical surgery. This was possible in one case and the patient was doing well so far. In the other case this was not possible and the outcome was fatal as far as can

be conjectured from the condition of the patient at the time of her discharge from the hospital.

Postoperative irradiation has been given successfully in one of these cases. Its usefulness as a routine procedure has still to be evaluated.

Treatment by nitrogen mustard and male hormones also has been suggested by some authorities.

These cases of dysgerminoma are reported for their peculiar clinical features and an evaluation of the treatment adopted has been attempted.

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ACUTE OEDEMA OF THE UVULA CAUSING RESPIRATORY EMBARRASSMENT, TRISMUS AND APHASIA

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D. N., aged 23, otherwise healthy, was brought to the medical inspection room at about 11 P.M. by his room mates. He was producing some inarticulate sounds and his breathing was laboured.

History—His attendants stated that the patient went to bed at about 8 P.M. when he was absolutely all right. They were roused by his groans and subsequently they discovered that he was breathing peculiarly and that he could not speak.

Examination—The patient was strongly built and well nourished. He felt most comfortable on sitting. He was conscious, but was unable to speak, and producing some inarticulate groans.

Temperature 97°F. Pulse 88/minute, regular. Respiration rapid, 48/minute. Both inspiration and expiration were laboured. Accessory muscles of respiration were working. Cyanosis was present.

Pupils were normal and reacting to light. Reflexes were found to be normal. Trismus was present.

A hurried examination of the respiratory, cardiovascular and nervous systems presented no abnormality.

The jaws were forcibly opened apart and a pale white globular mass, about 4½ inches in diameter, was found occupying the oropharynx. On careful examination it was identified as an elongated and oedematous uvula. The mass was also obstructing the posterior nasal apertures. It was tense, and cystic in consistency. The tonsils and the pharyngeal wall showed no abnormality.

Note—The place of occurrence was at an altitude of 14700 ft. and the temperature of the particular evening was −7°C.

Laboratory investigations could not be carried out for lack of facilities.

Treatment—The oedematous swelling could be easily reduced by puncturing it at multiple points after spraying it with ethyl chloride. As soon as the swelling was reduced his respiratory difficulties disappeared and he could speak with ease. The patient was treated for three days as follows :

(a) Lotio chlorosol mouth wash and gargle 6-hourly, followed by painting with 2 per cent mercurochrome solution. (b) Injection of penicillin sodium, 5 lacs stat, and 8 hourly. (c) Injection of streptomycin sulphate, 0·5 g. daily. (d) Phenergan tablet, 25 mg. twice daily. (e) Ascorbic acid, 100 mg. daily.

Progress—The patient had an uneventful recovery. His uvula retrogressed to normal size after three days.

Summary

A case of acute oedema of the uvula has been described. The patient was a healthy, young man who denied any history of throat trouble in the past.

His uvula returned to normal size after three days' treatment.

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REVIVAL OF THE LICENTIATE COURSE

The Licentiate Course has not apparently lost its charms though it was abolished years back. Talks of its revival have been reaching our ears since some time past. Currently a proposal is afoot to bring it to life with the object of meeting the shortage of doctors in the country. The Planning Commission is reported to have recently recommended its revival and the Government of Mysore, it is learnt, have already decided to restart this short course.

Prior to the abolition of the Licentiate Course a few years back, there was a thorough discussion on the subject. The Medical Council of the States and of India, medical men of all affiliations, and all thoughtful persons interested in medical education agreed that there was no utility in running the Licentiate course, and to cater to the health of the people, particularly rural health, there should be one uniform standard of medical education. Naturally, the government accepted this opinion and Licentiate teaching was abolished.

To restart it now on the plea of shortage of doctors is ridiculous. We do not know what is the motive behind this move. Is it to economise on medical expense by producing less qualified doctors to be employed on smaller remuneration?

Progress is the watchword of the present day. Will not the re-introduction of this shorter course of study in medicine be a setback to progress?

Government's plea is to employ its less qualified doctors in the rural areas but are not the rural people entitled to the best type of medical care? The Constitution of India forbids any discrimination amongst the people. So will it be justifiable to arrange a different and lower type of medical care for the rural population?

The Chief Minister of Mysore should abandon the idea of producing a lower grade of doctors particularly because an earnest attempt is now being made in establishing more medical colleges to produce more fully-qualified doctors. We would advise the Government of Mysore to go ahead, start more medical colleges and produce graduates to meet the demand of the State.

Medical science is expanding from day to day and at the present time we require fully equipped medical men to dispense uniform medical care throughout the country.

SUICIDE BY BARBITURATES

The incidence of attempted suicide in our country in recent years has gone up by leaps and bounds. It is for the psychologists to find the reason for this. But we think the socio-economic condition and lessened capability for toleration are the two main causes.

The *modus operandi* nowadays is different from that in the past. Now people want such methods which are not at all painful, there is some certainty of death and above all easy availability of the means.

From the recent figures gathered from day to day work either in hospital or in private practice, we find that the barbiturates are the most handy drugs that are being used for this purpose. Though there is Government restriction to sell them to the lay public without a doctor's prescription, these drugs are easily procured by interested persons. On enquiry from those patients who generally survive, we find that they collected these tablets not from one chemist's shop but from many, in small quantities from each one of them, and when a considerable number of tablets had been collected, they jumped into the final act.

These pills are swallowed easily and without the least discomfort towards the evening with the hope that the person will go into deep and everlasting sleep without drawing the attention of any other member of the family. It is also hoped that when subsequently detected, the subject will be either dead or in an irreversible condition.

Unfortunately for the suicide, modern medicine too has risen to the occasion. Nowadays it is not possible for the suicide to die if he or she is found alive by the doctor. However low the condition of the patient may be or whatever may be the amount of drug the person has taken, it is not impossible to restore the potential suicide back to normal life.

As soon as such cases come to the hospital, assisted respiration or artificial ventilation is carried out as the situation demands. If the blood pressure is low, it is raised by giving vasopressor drugs. The respiratory tract is kept clear of froth and mucus by repeated toiletting. Nutrition is maintained at first by intravenous therapy and later on by intragastric drip. The urinary bladder is relieved by catheterisation. Normal hygiene of the mouth and of the pressure points is observed. Antibiotics are given as precautionary measures.

If there be hyperpyrexia, mild hypothermia is carried out by repeated cold sponging.

The patient generally regains consciousness after a varying period from a few hours to a few

days, according to the nature of the drug, i.e., whether short or long acting or according to the quantity of drug swallowed. The longest period encountered in this country is 6 days, though there are records of longer duration elsewhere.

The heaviest quantity swallowed with revival of the patient was 92 grains. One can realise the massiveness of this dose from the fact that the ordinary therapeutic dose is only 3 grains. Still the patient was saved.

The use of analeptics has been abandoned a long time ago. 'Megimide' (β-ethyl-β-methylglutarimide), a comparatively new drug, came into vogue only a few years ago. But the consensus of opinion is unfavourable. Ordinary simple measures are quite enough to restore these patients to normal.

Within a short period of two weeks, one encountered three such patients—all females. They were found unconscious practically at the same hour of the night. All of them had barbiturates in some form. This increased incidence of attempted suicide is an extra load of work on doctors, to the hospital it is an unnecessary occupation of indoor beds, and to the families of these patients it is an enormous strain on nerves.

We would request the Government to be more strict and vigilant about the sale of these drugs by the chemists.

PRIMARY HYPERTROPHIC INTESTINAL TUBERCULOSIS

That the advent of bowel symptoms in pulmonary tuberculosis indicated serious prognosis was recognised by Hippocrates. As far back as 1862 Klebs[1] produced lesions in the intestine by feeding guinea pigs with bovine and human strains of tubercle bacilli. The first report concerning surgery of intestinal tuberculoma was published in 1891[2]. Blatin and Duguet[3] first described tuberculosis in caecal tumours. Blacklock[4] attributed bovine strains to be responsible for 50 per cent of tuberculosis in children under the age of 5 years in England.

Thus hyperplastic ileocaecal tuberculosis was a wellknown entity in the past. But in the West the diagnosis of this condition began to be doubted and seriously questioned after publication of the classical paper by Crohn *et al*[5] on nonspecific granulomatous lesions on the terminal ileum—described by them as regional enteritis or Crohn's disease. Since then it has been recognised that this disease entity does not confine itself to the last eighteen inches of the ileum but may extend to the caecum and the colon distally, and the jejunum or even the duodenum proximally. Gradually the hyperplastic form of ileocaecal tuberculosis was forgotten as a pathological and clinical entity so much so that Taylor[6] and Warren and Sommers[7] denied its very existence.

Here in India Mangalik and Misra[8] reported that cases described as ileocaecal tuberculosis were really regional enteritis or nonspecific granulomatous inflammation. The literature of the last two decades show a steadily increasing number of publications on Crohn's disease and a corresponding decrease in the number of cases of ileocaecal tuberculosis.

This tide was turned in India when Wig and his co-workers[9,10] and Anand[11] reported chronic granulomatous lesions of the intestines. In their series they did careful histopathological studies and intensive bacteriological examination of the biopsy material. Tubercle bacilli were isolated and typed. They also studied the morbid material before and after treatment.

A study of the biopsy material helps us in understanding the chain of histopathological changes which occur. At one end of the chain we find the most florid cases in which the whole tissue is replaced by caseation necrosis while at the other it is completely absent. The changes are present in both the affected intestinal wall and the regional mesenteric lymph nodes, but quite often they are confined to the latter. Tubercle bacilli are isolated from all types of cases irrespective of the presence or absence of caseation necrosis. Tubercle bacilli isolated in all cases are of the 'human' type. Hyperplastic ileocaecal tuberculosis is a more common condition in this country and probably accounts for the fairly large number of cases of granuloma of Crohn's type.

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CURRENT MEDICAL LITERATURE

The Useful Splenic Artery

LUKE, J. C. (*Surg. Gynec. & Obst.*, **110**: 633, 1960) from Montreal, Canada, writes:

The splenic artery is an ideal autograft for use in replacing other major abdominal aortic branches at the site of occlusive arterial disease or aneurysm formation. The splenic artery can be obtained by splenectomy or, preferably, by detaching it from the splenic pedicle without splenectomy.

When dissected to its aortic origin, the splenic artery can be swung to the right to replace the common hepatic or right renal arteries. The superior mesenteric and left renal arteries are readily reached. End-to-end or end-to-side anastomosis can be performed by either excising or bypassing the particular lesion concerned.

Six cases are described in which this technique was employed, in 1 to replace an aneurysm of the common hepatic artery and in 5 to revascularise the kidney in cases of arterial hypertension, the result of the Goldblatt mechanism. In 4 the prbcedure was carried out on the left side and in 1 on the right.

Giant-cell Tumours of Bone

SCHAJOWICA, F. (*J. Bone & Jt. Surg.*, **43A**: 1, 1961) from the Centre of Osteoarticular Pathology and the Department of Orthopaedic Surgery and Traumatology, Italian Hospital, Buenos Aires, gives in the following lines the summary of his observations on giant-cell tumours of bone.

A series of eighty-five cases of giant-cell tumours of bone studied in the course of the last twenty years is reviewed. Comparative clinical, roentgenographic, pathological, and systematic histochemical studies have been carried out.

The clinical and pathological findings confirm the necessity of treating these tumours as an entity, because they are neoplastic processes capable of progressive growth, recur in a large percentage of cases, and, in 7 to 15 per cent of cases become transformed into sarcomata. They may produce metastases without visible malignant transformation. The so-called variants, which in general have a favourable prognosis, are easily distinguishable from true giant-cell tumours.

With the exception of a few rare cases showing a frankly malignant microscopic structure, there was no evident correlation between the histological appearance and the clinical and roentgenographic features. For this reason, grading of this neoplasm is now considered of little value. It is sufficient to establish a diagnosis of true giant-cell tumour to justify complete resection of the lesion. This diagnosis can be made by aspiration biopsy.

I believe that the giant cell derives from the mononuclear cell of the stroma and is thus of mesenchymal origin. I think that it is formed not only by agglutination and conglomeration of these cells, as is maintained by the majority of writers, but also by repeated division of the stromal-cell nuclei, without corresponding cytoplasmic division. This is probably accomplished by amitosis or nuclear segmentation, which has been observed in tissue cultures.

Systematic histochemical investigations of normal tissues, true giant-cell tumours, and many bone lesions and extra-osseous lesions, which are characterised by the richness of multinucleated giant cells, were done. The giant cells in these tissues have a very similar histochemical behaviour. A close physiological and histogenetic relationship is thus established between normal osteoclastic and chondroclastic giant cells and those of giant-cell tumour.

Giant cells are characterised by an abundance of acid phosphatase, tetraglucuronidase, and succinic dehydrogenase; the absence of alkaline phosphatase; and the presence in their cytoplasm of non-glycogen carbohydrates, principally acid mucopolysaccharides, and complex lipids. The stromal cells of giant-cell tumours do not generally show enzymatic reactions, nor do they possess glycogen, mucopolysaccharides, or glycolipids in significant amounts.

Histochemical study is of no diagnostic value when differentiating the giant-cell tumour from its so-called variants.

Conservative Treatment of Diabetic Gangrene with Antibiotics with Corticosteroids

ENGELHART, G., HULSEMANN, B., SEIDLER, I. AND STOTTER, G. (*German M. Monthly*, **6**: 81, 1961) from the Medical and Neurologic Unit, Municipal Hospital, Augsburg, write:

Among 2000 diabetics treated at the Municipal Hospital Augsburg between 1955 and 1959, 50 developed gangrene of the leg which would have required amputation. Medical treatment alone—daily administration of 20 mg. of prednisone by mouth and 25 mg. prednisolone in crystal suspension intra-arterially, and repeated intra-arterial injections of tetracycline (Reverin)—preserved the limb in 27 and reduced the extent of amputation in another 3 patients.

Influence of Oestrogen and Progesterone on Electrolytes of Human Uterus

HAWKINS, D. F. AND NIXON, W. C. W. (*J. Obst. & Gynaec. Brit. Emp.*, **68**: 62, 1961) from Obstetric Unit, University College Hospital, London, write:

Analyses for water and electrolytes were conducted on biopsy specimens of human myometrium taken at operation. Intracellular levels of water and of the cations were calculated using "chloride space" to estimate the extracellular phase.

In non-pregnant patients, administration of oestrogen caused an increase in myometrial water content, which appeared to be confined to the intracellular phase, and an elevation of the calculated intracellular sodium level.

In early pregnancy administration of progesterone caused a fall in the calculated intracellular sodium level of the myometrium.

In late pregnancy myometrial calcium and magnesium were lower in cases treated with oestrogen or progesterone than in untreated controls.

It is considered that the increases in myometrial intracellular water and sodium levels which occur in pregnancy (Hawkins and Nixon, 1958) can be attributed to the effects of increased endogenous oestrogen.

Effect of Various Tetracyclines on Resistant Staphylococci

ROLLY, H. AND FUSSGANGER, R. (*German M. Monthly*, **23** : 91, 1961) from the Pharmaceutical Division of Ferbwerke Hoechst A. G. Frankfurt/Main-Hoechst write :

Experiments showed that pyrrolidinomethyl-tetracycline, given to mice infected with tetracycline-resistant staphylococci, resulted in a significantly higher survival rate than any of the other tetracycline preparations. But the blood-levels of pyrrolidinomethyl-tetracycline and tetracycline were of a similar rate in mice, definitely below the *in-vitro* sensitivity levels of the resistant staphylococci which were used. This would indicate that *in-vitro* determination of resistance may not necessarily give information about the therapeutic value of pyrrolidinomethyl-tetracycline.

Changes in Acid-Base Balance of the Blood during Pregnancy, at Delivery and Post-partum

SAMUELOFF, S., KOREN, Z. AND BRZEZINSKI, A. (*J. Obst. & Gynaec. Brit. Emp.*, **68** : 74, 1961) from the Department of Obstetrics and Gynaecology, Hadassah University Hospital, Jerusalem, Israel, write :

Metabolic changes in acid-base balance of the blood have been investigated throughout the course of pregnancy, at delivery and post-partum. There was no definite deviation from the normal during pregnancy. A metabolic acidosis due mainly to accumulation of lactic acid was found at the time of delivery. The source of the lactacidaemia is discussed.

Oral Diuretics and Bed Rest on Urinary Electrolyte Excretion in Oedema of Pregnancy

HUDSON, C. N. (*J. Obst. & Gynaec. Brit. Emp.*, **68** : 68, 1961) from Queen Charlotte's Maternity Hospital, London, write :

Ten patients with oedema of pregnancy or pre-eclampsia with oedema were treated with bed rest and then two oral diuretics. A definite increase in the excretion of sodium and chloride over the resting values was noted. There were concomitant weight changes.

Any difference between the two diuretics, used in the dosage specified, was not statistically significant.

There was one stillbirth and one patient in whom the pre-eclampsia obviously progressed.

It may be concluded that both these diuretics produce a similar and significant effect on oedema of pregnancy, as compared with bed rest. With regard to pre-eclampsia, there was some evidence that the disease could progress during their use and it would require a larger trial of different type to determine whether they can influence the foetal salvage. No side-effects were encountered in this trial.

Use of Nonsteroidal Oestrogen Antagonist

KISTNER, R. W. (*Am. J. Obst. & Gynec.*, **81** : 233, 1961) from the Department of Obstetrics and Gynaecology, Harvard Medical School, Boston, and the Free Hospital for Women, Brooklyn give in the following lines the summary of his observations on the use of nonsteroidal oestrogen antagonist :

A review is given of the background studies on ethamoxytrithetol.

The aetiology of "chronic cystic mastitis" is discussed.

A study of 25 patients is presented with representative cases.

Ethamoxytrithetol is discussed as an oestrogen antagonist with consideration of its efficacy, optimum dosage, and possible sites of action.

It can be concluded that 22 of 25 patients with chronic cystic mastitis received benefit from this compound and that side-reactions are minimal with the sustained release preparation.

Corticosteroids in Nonpatent Fallopian Tubes

KURLAND, I. I. AND LOUGHRAN, C. H. (*Am. J. Obst. & Gynec.*, **81** : 243, 1961) from the Department of Obstetrics and Gynaecology, Cumberland Hospital, and State University of New York, Downstate Medical Centre write :

Twenty cases of tubal occlusion proved by repeated radiologic examinations, Rubin test, and/or culdoscopy were treated with corticosteroids.

Eleven of the 20 cases demonstrated tubal patency after 3 to 6 months of treatment. Of the 11 patients, 6 became pregnant. Two were delivered of normal infants at term; 2 are in the early and 2 are in the later months of gestation.

By constant refinement of cortisone and hydrocortisone newer products are becoming available. The dose and duration of therapy can therefore be reduced, giving the clinician a greater safety factor. The avoidance of the unwanted deleterious side reactions widens the scope of this potent hormone in gynaecologic problems.

Treatment of Eclampsia

LLEWELLYN-JONES, D. (*J. Obst. & Gynaec. Brit. Emp.*, **68** : 34, 1961) from General Hospital, Kuala Lumpur, Malaya, writes :

The treatment of 227 eclamptic patients is reviewed. All the patients were from the same geographical area, all had comparable nutritional backgrounds and all were treated in one unit. Three methods of therapy were used. These were (1) continuous intravenous thiopentone, (2) rectal bromethol and (3) a modification of the use of the "phenothiazine derivatives", together with intermittent thiopentone.

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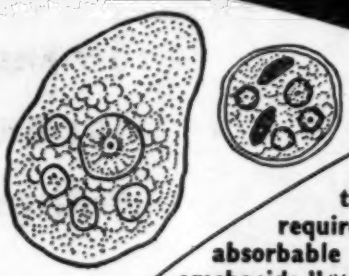

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CURRENT TOPIC

FERTILITY PATTERN IN CALCUTTA : A STUDY IN DEMOGRAPHY

An interesting and valuable study in Calcutta's demography—the fertility pattern in the city and its relation to income, age and occupation—has been made by Prof. S. B. Mukherjee of the Department of Economics, Calcutta University.

It indicates for instance : The higher the level of education of the mother, the less is likely to be the number of children born to her; women in rural areas are more fertile than their sisters in towns; the fertility rate is also related to income at a particular standard.

Prof. Mukherjee smashes, incidentally, some of the usually held theories that the poorer a man is, the larger is the size of his family, or that a manual worker has a large family. He also destroys another popular notion that an illiterate woman gives birth to a larger number of children than a literate one does.

The studies are contained in a book published by Bookland (P) Ltd., with a preface by Prof. S. N. Sen of the Department of Economics, Calcutta University. Prof. Sen says : "A number of interesting conclusions emerge from Mr. Mukherjee's analysis of fertility rates. He has made an attempt to examine the differential fertility rates among women who lived in urban areas and others living in villages." "It seems from his study that total fertility among women who have lived in Calcutta since 1934 is definitely less than that among others who came to the city after 1935. The former, called resident women, have total fertility of 47,710 as against 62,763 for the migrant women." Prof. Sen infers from the studies that total fertility is higher among women who live in the rural areas. "It seems, therefore, quite possible that urbanisation may prove to be an important factor in bringing about a decline in fertility rates."

Differential fertility, it is held, rather helps than hinders the socio-economic progress in the city of Calcutta. "The higher the level of income above a certain standard (households with an annual income of Rs. 9,000 or more), the less is likely to be the number of children born to mothers living in such households. Similarly, the higher the level of education of the mother (above a certain standard), the less is likely to be the number of children born to her."

In Four Rounds

The demographic study has been made in four rounds, each round surveying between 1,329 and 1,874 family units. Here are some of the findings of Prof. Mukherjee :

The city with 139 persons per acre (1951 census) grows by immigration, the migrational flow being chiefly from the rural zones of the States of West Bengal, and the adjacent States of Bihar, Orissa and U.P. "The result is that a large section of the people, though living in the city, retains rural habits, rural outlook and non-urban environment in homes. This naturally affects fertility conditions."

The background of the living conditions are : 30 per cent of the people have no water tap attached in their residences; 12 per cent have no latrines; 61 per cent have no bathroom; 78 per cent have no separate kitchen; 45 per cent have no electric connection.

Age at Marriage

The most popular age for marriage for men is between 24 and 25 years. The age-group 22-23 is a close second with the third position shared by the age-groups 20-21 and 26-27.

One-fourth of marriages are solemnised by the time a man reaches his 22nd year, and more than a half of the marriages takes place by the time he passes his 25th year.

By the time he reaches the 29th year, the chances are about 80 in 100 that he is already in wedlock. Not less than 75 per cent of marriages take place between the ages of 16 and 27.

For women the most popular period for marriage is the age-group 14-15, with age-groups 16-17 and 12-13 closely competing for the second position. About one-third of the marriages take place by the 13th year of the girl, while by her 15th year chances are about sixty in one hundred that she is already married.

Women whose age at marriage lies between 8 and 23 years constitute about 95 per cent of all married women. The average interval between marriage and the birth of the first child for all these married women taken together is about 3·7 years. (Puberty is attained at 13 or 14 in this country).

Number of Children

About 16 per cent of married women have one child only; about 17 per cent two children; less than 14 per cent three children. The proportion of families with increasing number of children progressively declines. (A small family is defined as having three children or less; a medium-sized family four to six children; a large family seven or more).

On the basis of these definitions, "it will be observed that in Calcutta about 47 per cent of the families (excluding childless ones) are small-sized, about 27 per cent of the families are medium-sized, and about 10 per cent of the families are large-sized."

A mother in Calcutta bears on an average from 3·56 to 3·79 children. The number of children born is the highest when the age of the mother at first birth is sixteen. Thenceforward, the number of children born seems to decline as the age at first birth advances.

Male-female proportion of births—"A mother in Calcutta bears on an average 3·65 children of whom 1·95 are males and 1·70 females."

Mortality and size of family—"In families of one child, the incidence of mortality is about nine to 10 per cent; in families of 2 children, incidence is 13 per cent; in families of 3 children, incidence is about 14 per cent; in families of four or five children it is about 16 per cent. The overall trend then seems to suggest the

hypothesis that the larger the size of a family, the higher the incidence of mortality in its children. Incidence of mortality starts from a level of about 10 per cent in families of one or two children, rises gradually with larger-size families, until it becomes about 20 to 22 per cent in families with nine or more children."

Differential fertility (income-groups)—In each of the four rounds of survey the lowest income-group (Re. 1-100) has the smallest number of children. As one goes up to the next higher income-group (Rs. 101-200), the average number of children born uniformly increases. In the next higher group (Rs. 201-350), the average increases in three cases and remains almost the same in one case. In the income-group Rs. 351-750, the average increases again in three cases, but decreases in only one case. In the highest income-group (Rs. 751 and above), the average decreases in three cases and remains the same in one case.

Thus up to the income-level of Rs. 750, there is clear evidence of a positive correlation between higher incomes and the size of the family. This trend operates up to a moderate standard of living. Upward of this level higher incomes are associated with smaller number of children.

The explanation given by Mr. Mukherjee is: "Conditions that militate against large families are more frequently found among lower economic groups: overcrowded houses, economic insecurity, the relative slacking of the kinship ties, etc. It is a fact in Calcutta that the joint family system (which favours high fertility) survives more among middle income-groups than among either lower income-groups, or among higher income-groups."

Role of fertility and education (divided in four groups of illiterate, literate, below matric, matric and above)—"The number of mothers in the highest education level was very small in each year (of survey). The number of mothers in the immediately lower category was about four times the number in the highest group. The number in the two lowest education-categories were more or less equal, and the number in each of these was two to three times as large as the number in the group "Below Matric". Thus each of the groups 'Illiterate' and 'Literate' constitutes about 35 per cent to 40 per cent of the total sample, and when combined they make up about 80 per cent of the total. Mothers in the group 'Matric and above' constitute not more than 5 per cent of our sample."

The average number of children is a little more than three among illiterate mothers. The average rises to about four among literate mothers. Among mothers who have received some school education but have not passed the matriculation the average records a slight fall. In the case of mothers who are either matriculate or have received higher education, the average records a sharp fall, that is, to less than three.

Prof. Mukherjee concludes: "A hundred illiterate mothers in Calcutta bear on an average 331 children; a hundred literate mothers bear 402 children and a hundred below-matric mothers bear 392 children. We have refrained from giving any estimate for mothers with still higher education; yet it will be more or less a dependable guess that a hundred such mothers bears more than 200 and less than 300 children."

He further says: "That mothers with low education bear a large number of children than illiterate mothers, fits in well with the fact that illiterate mothers come largely from the low income-groups, and low occupation-categories while a larger proportion of mothers with some education belongs to higher income-groups and occupation-categories."

Occupation, husbands and family size—In respect of occupation, husbands who pursue one of the highest paid executive or technical or professional occupations have been found to have smaller families, while in the case of other occupations, the higher the ranking of the occupation, the larger has been the size of the family. Thus traders most of whom consist of hawkers, pedlars and small shop-keepers have larger families than manual workers; families where the husband holds one of the ministerial groups of occupations have larger number of children than traders, and those who follow one of the ordinary technical or professional occupations have larger families than the ministerial job-holders.—*Hindusthan Standard.*

NOTES AND NEWS

International Training Centre for Treatment of Leprosy

An international training centre in treating leprosy is proposed to be set up at Vellore with aids from foreign countries like U.K., U.S.A., Sweden and Switzerland, for the rehabilitation of the leprosy patients, and for giving training to such of the surgeons as undertake to treat leprosy.

The Vellore Christian Mission Medical College Hospital is taking special interest in this regard. A building each for the men's internment quarters and house-surgeons' quarters, and nurses school are to be raised. Already about Rs. 4,75,000 have been received for the men's internment quarters and about Rs. 1,94,000 for the nurses school building.

The Swedish Red Cross Society have promised to provide quarters for the physiotherapy trainees. A large gift is expected from West Germany.

Identification of Blood Stains

Two British Forensic scientists have found a method of identifying blood stains. The methods likely to be adopted by police laboratories throughout Britain will help in the investigation of crime, says a British Information Services Press release at New Delhi.

It adds that their discovery makes it possible to identify the blood group of the smallest stain, and may help the prosecution or the defence where the evidence relies on establishing the group of blood found on clothing.

Now it is possible to tell the blood group of a smaller amount than can be contained on a single hair. Until now, scientific witnesses have often been unable to identify samples of blood because they were too small.

The discovery has been made by Dr. Barbara Dodd, Lecturer in Forensic Medicine at London Hospital Medical College and Mr. Robin R. A. Coomb, Veterinary Surgeon and Serologist of Cambridge University's Department of Pathology. Theirs is the first discovery in this field for 40 years.

New U.S. Drug for Hypertension

Successful tests of a new drug for treating hypertension have been made by a team of New Jersey scientists.

The drug is described as the first compound in the benzothiadiazine series in which anti-hypertensive properties have been separated from diuretic properties. It was given in small doses to hypertensive dogs and their blood pressure fell gradually.

Vaccine Against Common Cold

A vaccine against the common cold was now a possibility following the discovery by British scientists of a way to detect certain common cold viruses in a test tube.

The British Medical Research Council announcing this in its annual report spoke of a "break through" in research after 12 years' work at the Council's Common Cold Research Laboratory at Salisbury.

It was discovered that, with modification of the technique of tissue culture, viruses of the common cold could be grown consistently, the report said.

Sir Harold Himsworth, Secretary of the Council, speaking about the common cold said that when a vaccine was obtained he hoped it would give protection against 25 to 50 per cent of colds.

Transplantation of Kidney

A new kidney grafting technique developed at a London hospital has been used to transplant healthy kidneys from two husbands to their wives, it was announced at London on July 23, 1961.

Professor Ralph Shackman, Professor of Urology who directed the operations, said: "The actual operation was successful, but it would be premature to express an opinion about the permanent effects". A patient who had a similar operation four months ago was still making good progress, he added.

The new technique involves the use of massive doses of radiation to reduce the patient's resistance to the transplanted kidney which is normally treated as a "foreign body".

Radioactivity at Safe Level

Dr. Donald Glaser, an eminent U.S. nuclear physicist, said on 24-7-61 at New Delhi that inspite of all the nuclear explosions carried out so far radioactivity in the world was at a safe level.

People in various countries, he told a Press Confefence, had been living for centuries in the midst of so many natural objects, which generated radioactivity, without suffering any bad effects.

Since the level of radioactivity in the world today was near the natural level, he added, it could not have any ostensible bad effects. He named the black sands in Kerala as one such object.

Replying to a question, Dr. Glaser said that whether nuclear energy could be utilised for lighting or such other peaceful purposes was now mainly a question of economics and the possibility of such use of nuclear energy, therefore, differed from country to country.

The young scientist, who was given the Nobel Prize in 1960 for his invention of the "bubble chamber" in which atomic particles can be photographed, said that India had been particularly active in the study of cosmic rays.

Oxygen 'Lung' for Cancer Treatment

A machine to make the treatment of cancer patients by radiation more effective has been shown publicly for the first time at University College Hospital, London. Sir Alexander Maxwell, chairman of the hospital's board of governors, spoke on the new device, the only one of its kind in the world.

Patients are put into a kind of transparent "iron lung" containing only oxygen, and the pressure around them is raised to three or four times the normal atmospheric pressure.

It is known that cells are more susceptible to damage when irradiated in the presence of oxygen. Accordingly, the patient's cancer cells are steeped in oxygen by the high pressure and then bombarded by the radiation.

The patient can be given the radiation and the high-pressure treatment without suffering claustrophobia, because he can see out, and without the need for anaesthesia, because no pain is involved.

Manufacture of Antibiotics

The U.P. Government has decided to set up a factory for the manufacture of antibiotics in the State at a cost of Rs. 15 crores.

A Press release issued by the Government on 14-7-61 says that the factory is expected to go into production in 1964. It will produce a wide variety of antibiotics and the monthly production will be of the order of about Rs. 2 crores. Land has already been secured and a team of Russian experts will soon arrive to start preparatory work on the factory.

Revision of Medical Curriculum

Dr. B. N. Purandare, President of the College of Physicians and Surgeons of Bombay, said on 24-7-61 that the medical curriculum required proper revision and rearrangement.

Delivering the convocation address at the college at Parel, Dr. Purandare said that the pre-medical science course should be so framed as to be really useful for medical students.

Those who might take up the medical course formed only a small percentage of Inter. Science students, the majority of whom went for engineering and other branches of science. He emphasised that the interests of medical students should not be ignored at the Inter. Science stage.

Success of Malaria Eradication Drive

Eradication of malaria in Bihar will be completed by the end of the Third Five-Year Plan. By this time the Malaria Eradication Programme will be brought to an end.

The drive to control malaria was started in this State in 1952. After some years when it was found that the incidence of malaria had gone down to the lowest level the control drive was converted into eradication drive two years ago.

A sum of over Rs. 4 crores has been allotted for eradication of malaria during the Third Plan period. During the current financial year a sum of Rs. 2·35 crores will be spent over eradication of malaria. Malaria eradication programme will be wound up in phases. There are 42 malaria eradication zones in this State. Fifteen to 20 of them will be closed next year. In this way gradually all zones will be closed by the end of the Third Plan period. But this closing down will be done on recommendation of malaria experts of the Government of India who will visit Bihar in January, 1962.

Births and Deaths Registration

The Central Government propose to initiate legislation to make registration of births and deaths compulsory all over the country.

The registration will have to be normally done within 72 hours and the law will provide for standard forms of birth and death registration available at the registration offices set up for the purpose.

The legislation is likely to be on the lines of the Control of Drugs Act or the Prevention of Food Adulteration Act. It will provide for compounding of offences and penalties for violation of the law.

Without a better measure of our birth and death rate, it is felt much of the country's projection into the future will be in the nature of surmises.

In the middle of April this year, the Registrar-General in the Ministry of Home Affairs, had also convened a conference of State Health Secretaries and Directors to discuss how the registration of vital statistics could be improved.

Housewives Biggest Unit of Tuberculous Patients

According to a survey made by the Bengal Tuberculosis Association, housewives suffer more from the disease than others. Of the 15,539 diagnosed cases covered by the Association's survey, 4,681 were those of housewives. They form 30·13 per cent of the total cases.

Occupationwise, next to housewives come the unemployed who form 19·38 per cent of the total cases. They are followed by those staying at home (9·74 per cent), day labourers (9·76 per cent), students (4 per cent), clerks (2·79 per cent), shopkeepers (2·21 per cent), cultivators (2 per cent), miners (1·29 per cent), transport workers (0·64 per cent), artisans (0·62 per cent) and pressmen (0·17 per cent).

According to age-groups, it is found that males in the age group of 30 to 40 years and females in the age group of 20 to 25 years suffer more from the disease.

Balanced Diet for People

Mrs. John Kenneth Galbraith, wife of the American Ambassador to India, who was making a present of a mobile van, gifted by the Wheat Associates of America to the organisers of the Madras Mobile Extension Nutrition Programme, at the courtyard behind Rajaji Hall, Madras on 19-7-61 said that wheat was the most plentiful of the world's best food-grains. She added that, apart from making "the most intelligent use" of available foodgrains, they should not lose sight of the need to provide for the people a better diet at all times.

The Wheat Associates is an organisation that represents the wheat farmers of the United States, who have organised themselves into marketing organisations. As a part of their programme to promote the use of U.S. wheat throughout the world they have established six overseas offices, of which three are in Asia, in New Delhi, Tokyo and Karachi.

Drive for Blood Donors

The Chief Minister of Maharashtra, Mr. Y. B. Chavan, stated in Bombay recently that concerted efforts should be made to popularise blood donation and to provide blood bank facilities in every district.

Mr. Chavan said that it would be very necessary to organise an effective drive to find a larger number of blood donors than at present.

The Chief Minister was presenting awards to blood donors at a function arranged by the Voluntary Blood Transfusion Service and Dr. Anand Pardhy Memorial Fund.

Scheme to Double Milk Yield

A scheme approved by the Food and Agricultural Organisation and the Technical Co-operation Mission for doubling the milk yield of cattle will soon be launched in Anand by the Kaira District Co-operative Milk Producers Union.

The Kaira Union hopes to double the milk yield of cattle in 200 villages where its members are operating by giving the cattle balanced concentrate feed and by improving the breed of cattle.

The construction of a factory at a cost of Rs. 20 lakhs has begun near Anand to produce a balanced feed for cattle.

The FAO and the TCM had shown an interest in this scheme. Within seven years of the starting of the cattle feed factory, the milk yield of cattle in the area could be doubled.

If the experiment succeeded in Anand, similar factories would be set up in various parts of India.

Midwifery in Bengal

The Silver Jubilee of Bengal Obstetric and Gynaecological Society was celebrated at the Calcutta Medical Club on 25-7-61. Dr. Subodh Mitra, Vice-Chancellor,

Calcutta University and also the president of the Society inaugurated the function.

Welcoming the guests and members, Dr. Mitra reviewed the activities of the Society since its inception. He also briefly traced the development of midwifery in Bengal.

Sri Kanak Das Gupta, Secretary of the Society announced at the meeting that a nucleus was formed to award Silver Jubilee Commemoration medal to the best student in D.G.O. of the Calcutta University every year. The first donation of Rs. 100 was received from Dr. Subodh Mitra.

Dr. V. N. Shirodkar, eminent obstetrician and Gynaecologist of Bombay and the president of Federation of Obstetrics and Gynaecological Societies of India, was present. Dr. Satinath Bagchi, a senior member of the profession and founder member of the Society, addressed the gathering.

The inauguration session was followed by a scientific session. Dr. Chunilal Mukherjee, presided ; Dr. P. C. Das, Dr. D. L. Poddar, Dr. C. Ghosh and Dr. Tarun Banerjee took part in the discussion. The subjects of discussions were : (1) The Development of Obstetrics in Bengal during the last 25 years; (2) Plan on future activities of the Society to improve the teaching and practice of Obstetrics and Gynaecology.

In the evening Dr. V. N. Shirodkar delivered Sir K. N. Das Memorial Oration on "My experience in Tuboplasty".

Life-saving Drugs at Cost Price

The Orissa Government have opened 220 sales stores during the current financial year in the interior areas of the State for selling to the public life-saving drugs at cost price.

The Government have sanctioned Rs. 9 lakhs for purchase of such medicines and each of the sales store is provided with life-saving drugs worth Rs. 2,000 to Rs. 4,000, according to the necessity of the place.

Refresher Course for General Practitioners

The faculty of the Christian Medical College and Hospital, Vellore, will offer an intensive Refresher Course for General Practitioners this year. A similar programme was conducted last year. Details of the Course which will last for one week commencing on Monday, September 18, 1961 may be had from the Medical Superintendent of the institution.

British Company Offers Six Fellowships

Six new Fellowships, to be awarded to overseas doctors, have been established by one of Britain's leading medical houses, Smith & Nephew Associated Companies Limited.

The Fellowships, worth £1,200 a year each and tenable only in the United Kingdom, will go to medical graduates selected from British Commonwealth and developing countries and will be available in any branch of surgery or associated research. Further information can be obtained from The Secretary, Smith & Nephew Associated Companies Ltd., 2, Temple Place, Victoria Embankment, London, W.C. 2.

Medical Library of DGHS, New Delhi

The medical library of the Directorate General of Health Services has shifted from North Block to the Combined Council Building, Kotla Road, Temple Lane, New Delhi 1. The Library is open for consultation for the medical profession. Working hours are : Mondays to Fridays—10.00 A.M. to 8.00 P.M.; Saturdays—10.00 A.M. to 5.00 P.M. Closed on all Central Government gazetted holidays.

CORRESPONDENCE

The Editor is not responsible for the views expressed by the correspondents

Revival of Licentiate Course

SIR,—About six months back, on learning that the Mysore and some other States were thinking of restarting the L.M.P. course with only three years' training, on the advice of the Planning Commission, to provide cheap doctors for rural dispensaries, myself as well as other doctors, and medical associations, strongly protested to the authorities concerned. I had also requested the profession to be ready to take some suitable direct action if this sinister move materialised.

Mysore State has now definitely decided to do so from this session. It is therefore requested that all medical men and bodies should decide upon some direct action against this move and that immediately.

I think we can safely decide upon (i) protests from all medical men of all affiliations and their Journals, and (ii) resignations of all members from Medical Councils of States, Medical Council of India, State Medical Faculties and Medical Boards. We have to see that these bodies remain empty and defunct until the governments concerned desisted from taking this retrograde and harmful step. The momentous and right decision for one M.B.B.S. standard was taken throughout the country unanimously by the I.M.C., the Medical Councils of States, the Medical Associations, the State and Central Governments and the public at large. Again, since the Constitution guarantees equal deal to all citizens it will be dishonouring the Constitution if quack-type doctors are produced again, for providing medical care to the poor rural people. I am, etc.,

Prabhupur,
Varanasi. SUBA BAHADUR SINGH.

Revival of Medical Schools

A news is current that the Mysore Government have decided to open two medical schools in the State. Medical schools in India are a relic of the British rule. They were created to produce a type of doctors to serve as assistants to the British doctors employed both in the Military and the Civil Departments. They were not given any independent charge. They were a class by

themselves and there was no opening for them to improve their status.

With the advent of independence, the Government of India after long and serious consideration decided to have only one uniform standard of medical education, i.e. the M.B.B.S. course, throughout the country. This decision was communicated to various State Governments for necessary action, and the result was that in due course all medical schools in the country, with the single exception of one in Ludhiana, were either upgraded or closed down. To revive them now is absolute retrogression which none can support.

It is argued that since medical graduates are unwilling to serve in the villages the medical licentiates, as produced by these schools, would be ready to serve in the rural areas. The facts, however, falsify these hopes. For instance, in the Punjab where the licentiates course still continues, the year to year additions to the number of licentiates have not brought about any improvement in the position of rural dispensaries going without doctors.

According to the Plan the rural dispensaries, that are at present manned by the licentiates, are ultimately to be converted into Primary Health Centres where the provision is to employ medical graduates only. Where then lies the necessity of producing more licentiates and wasting huge sums of money? Besides, the Planning Commission has recommended the opening of 15 more medical colleges in the country during the Third Plan period.

The villagers have got the right to have the same standard of medical aid as the urbanites have. Besides, the latter have an advantage of consultations with various specialists available in the urban areas but the village folk have to look to the village doctor only for all types of ailments. So it is all the more necessary why the village doctor should not only be fully qualified but also be of mature experience.

The revival of the licentiate course has been strongly opposed not only by the whole medical profession in the country as represented by the Indian Medical Association but also by the Indian Medical Council, the only competent authority in the country on the subject and the All-India Medical Licentiates' Association.

While addressing the 54th Session of the Indian Medical Council on 5th November 1960, its president Dr. C. S. Patel said :

"I am sorry to find that attempts are being made to revive the licentiates' course. This is a most retrograde move and should be opposed. When there is a clamour for equality in the status of doctors it is wrong to think in terms of two types of doctors and to create a caste system. If the idea is that these licentiates will go and settle in the villages, then the facts of the last so many decades falsify the hopes".

The Working Committee of the Indian Medical Association at its meeting held at Kanpur on 19th August, 1960 also adopted the following resolution :

"The Working Committee views with alarm the proposal of the Planning Commission to revive the licentiates' course in medicine to meet the apparent shortage of doctors. It has been definitely accepted by the Government that there should be only one standard of medical qualification and that is the University degree. The licentiates' course has been dropped for over several years now and facilities have even been offered to licentiates to qualify for the degree. The Working Committee strongly opposes the recommendation of the Planning Commission and requests that the proposal be dropped once for all." I am, etc.,

Ludhiana. (DR.) CHHABIL DAS.

REVIEWS

Radioactive Wastes—Their Treatment and Disposal—By John C. Collins, B.SC., M.S.E., A.M.I.C.E.; E. & F. N. Spon, Ltd., 22 Henrietta Street, London WC. 1; 8½"×5½", pp. xxii+239; 55s. net.

The widespread use of radioactive isotopes in scientific investigations throughout the world has brought with it the dangers of inadvertently exposing the whole population to ionising radiation through pollution of drinking water and air, with its dire effects on the health of the adults and worse still, with its possible remote effects on the progeny. Publications have been and are being released from time to time on international standard on methods of control and disposal of radioactive wastes and on radiological protection service but these are widely scattered. This book presents much useful information.

The subject is highly technical but in this book it has been presented in a simple way understandable to all with some preliminary knowledge of nuclear physics and mathematics. It contains many data and standards for ready reference.

The book has been written in a general way to suit any worker with isotopes—be he a reactor technologist, a metallargist or a physician who can certainly get useful information regarding the principles of radioactive waste disposal.

Safe disposal of the active excreta of patients on therapeutic doses of radioactive isotopes and protection of the nursing staff attending these patients are vexed problems confronting the physician. As a matter of fact, any internationally approved method of control of these is still lacking and every hospital improvises its own ways which widely differ from one another. A detailed discussion on these problems would have been more appreciated by a physician in such a publication.

B. BHATTACHARJEE

A Handbook of Tropical Diseases—By J. C. Banerjea and P. B. Bhattacharjee with contributions by Drs. R. N. Chaudhuri, N. V. Bhaduri, L. K. Ganguli, A. Mondal, P. C. Sengupta and J. B. Chatterjea; 6th edition, 1960, Academic Publishers, Calcutta; 9"×6", pp. 515; Rs. 20·00.

This well-known manual has been well received by the medical students since its first publication under the joint authorship. Very many texts in tropical medicine existed when the book made its first appearance but from the student's point of view these were much too volu-

minous and elaborate. The book presented the salient aspects of tropical medicine in a practical way, lending itself for ready reproduction in examination answer papers. The authors have been careful to see that the book gained in popularity, edition after edition. The present sixth edition in a distinct improvement over its preceding ones and much of this is due to inclusion of six other contributors to this volume, each well known in his particular field.

Aetiology of various tropical diseases has been fairly well covered but it seems to the reviewer that pathogenesis has been rather inadequately discussed. None can possibly learn from this book the exact mechanism of production of chyluria and some would like to know more about the nature of the so-called "granular fatty deposit" in the sediment of the chylous urine.

Pathology of tropical diseases has been fairly well discussed but has not been adequately illustrated. For example, a composite picture showing the comparative histopathological changes in spleen, in malaria, kala-azar and tropical splenomegaly would have been more helpful in understanding the pathology of these diseases than mere descriptions of the pathology of spleen under individual heads. In taeniasis diagrams of the ova of various tapeworms have been presented but diagrams of the gravid uterus and its lateral branches in segments of *T. solium* and *T. saginata*, when a segment is examined compressed between glass slides, should have been included.

One particular aspect of the tropical diseases should be discussed in the next edition of the book and that is 'immunity in tropical diseases'. The reviewer feels such an inclusion will enhance the value of this book to advanced students. Clinical features, including differential diagnosis and complications are well discussed but these seem to have been neglected at places. Clinical features of giardiasis, so common in this country, has been disposed of in a few lines. The hints on treatment of the individual diseases are on the whole practical. A comparison with other existing treatises in tropical diseases or text-books of medical treatment will at once disclose the superiority of this book to others in respect of the various practical measures of treatment but if the book is to enhance its usefulness for the practitioners the treatment should be further elaborated and end results of treatment should be included. Some of the indigenous medicines should be more thoroughly discussed if the attention of the foreign workers is to be drawn to these. For example, one can get from the book hardly any idea about the nature of *Vitex peduncularis* itself, while learning much about its methods of use.

Some of the valuable space in the book could be saved for elaboration of some of the aspects mentioned above. The sections on trichiniasis and types of typhus fever non-existent in India could be easily condensed for this purpose. Giardiasis which is seen daily has been allotted one and a half page and trichiniasis which we do not see at all has been given four pages. This disproportionate emphasis should certainly be rectified in the future editions.

In general, the present edition of the reputed work should continue to maintain its popularity and prestige among students and junior practitioners. What has been said above, by way of criticism, has been done in a constructive spirit, and should not detract from the value of the book as a practical, succinct and handy volume on tropical diseases by two pioneer Indian authors, and six other well known contributors.

H. K. Roy

Disc Lesions and other Intervertebral Derangements—By E. J. Crisp, M.D. (CANTAB.), D. PHYS. MED. (LOND.); 1960, E. & S. Livingstone, Ltd. 16 and 17 Teviot Place, Edinburgh 1; 8⅛″×5⅛″, pp. 158; 15s. net.

This handy monograph by an authority on physical medicine is a welcome addition to the vast literature on disc lesions and the elusive back pain syndrome. A common condition which afflicts mankind, back pain, the aetiology of which is not the same in all cases, has naturally undergone management by various methods during the last 50 years, first by manipulation, then by exercises and bodily posture inmobilisation, disc operations which were a rage only recently and lately a swing over to manipulation and traction. Hence the detailed technique of manipulation and traction with 48 illustrations incorporated in the volume is not only timely but useful.

Other chapters include basic sciences regarding disc lesions such as anatomy, physiology and pathology.. Lesions of zygapophysis and ligament injuries in different regions with clinical features are described. Two new interesting clinical problems, namely, fibrosis of ligamenta flava and tripping of synovial membrane between zygapophysial joints, are described that need further investigation.

With a beautiful get-up and a useful index, this lucid book is recommended for all concerned in the management of disc lesions, viz., orthopaedic surgeons, physiotherapists and general practitioners.

K. S. Bose

Classics of Medicine and Surgery—Collected by C. N. B. Camac; 1959, Dover Publications, Inc., New York; 8″×5¼″, pp. x+ 435; $2.25 net.

It is seldom that research workers have direct access to the original epoch-making writings of classical masters. The work and observations of the latter were so thoroughly and accurately done that modern teaching, practice and terminology are either the same as when first reported or based directly on them. Often, subsequent writers have merely paraphrased the statements of the original masters.

The editor's selection of original masterpieces in the English language first appeared a little over fifty years ago. This Dover cheap paperback edition of Camac's collections contains the modern classics of medicine and surgery. Original papers included in this edition are : Lister's 'Antiseptic surgery' (1867), Harvey's 'Motion of the heart and blood in animals' (1628), Auenbrugger's 'Percussion of the chest' (1761), Laennec's 'Auscultation

and the use of the stethoscope' (1818), Jenner's 'Inquiry into smallpox vaccine' (1798), Morton's 'Mode of administration of sulphuric ether by inhalation' (1847), Simpson's 'Chloroform in surgery and midwifery' (1848), and Oliver Wendell Holmes' 'Contagiousness of puerperal fever' (1843-55).

Most of the sections are prefaced by a short biographical sketch of the author with his portrait, and followed by a list of the author's other publications.

This book is worth possessing. The format is good and the price is very popular.

J. DHAR

OBITUARIES

Dr. B. Sarker

Dr. B. Sarker, B.Sc., M.M.F., a member of Nungi-Batanagar Branch, IMA, breathed his last on July 19, 1961 at Nilratan Sarkar Medical College Hospital where he was operated for enlarged prostate with suppression of urine. He was 64 years of age at the time of his death. He left behind him his widowed mother, wife, three sons, four daughters, 5 grandchildren and innumerable friends and well-wishers to mourn his death. He was one of the active members of the branch and worked in Bata Shoe Co., Private Ltd. as a Medical Officer for a long time. Subsequently with the idea of serving the people in the rural areas of the locality he resigned and started his career as a private practitioner having a dispensary in the rural area of Nungi where he became very popular. He was always a friend and guide to the poor and helped the needy in all respects.

Dr. Surendra Nath Sikdar

Born in 1909 in the village Dhaneswari in the District of Dacca, Dr. Sikdar passed the Matriculation Examination in 1925 and the I.Sc. in 1927. He qualified as an L.M.F. from Dacca Medical School.

He started his career as a private practitioner and later joined Tea garden service in 1942. He joined Choonabhati T. E. in the same year and served for 19 years as Assistant Medical Officer. He expired on 22-5-61.

He is survived by his widow, four sons and a daughter.

Dr. M. L. Barman

Dr. M. L. Barman was born on April 16, 1911. He passed the M.B.B.S. examination from the Patna University in 1935, and proceeded to the United Kingdom at the end of 1938.

Dr. Barman passed F.R.C.S. (Edin.) in 1943 and worked as Orthopaedic Registrar in U.K. for about a year and returned to India in 1944. He worked as a surgeon in various institutions of Calcutta, such as Campbell Medical School and Hospitals, Lake Medical College and Hospitals, Marwari Relief Society and Medical College Hospitals.

From 1952 he had been working as the Hony. Senior Visiting Surgeon of the Orthopaedic Department, Nil Ratan Sarkar Medical College Hospitals, Calcutta, till his death. He was an active member of the Executive Committee of the Orthopaedic Section of the Association of Surgeons of India. He breathed his last on April 28, 1961.

Dr. Barman is survived by his widow and six children.

Dr. Khushman D. Smart

Dr. Khushman D. Smart, a well-known private practitioner of Mandsaur (Madhya Pradesh) breathed his last on May 1, 1961.

Dr. Smart was born at Guna (Madhya Pradesh) on April 10, 1913. He passed L.M.P. (Bombay) in 1943. He was E N M P (Bombay) also. In 1945 he settled in Mandsaur after working in K.E.M. Hospital and two other famous hospitals of Bombay under expert doctors. He was the only eye specialist in Mandsaur and the only surgeon amongst private doctors of the city.

As a scholar of Sanskrit, music and drama, Dr. Smart was very well-known in the whole district. A prominent Congress worker and a strong nationalist, he was connected with several associations and public institutions.

Dr. Smart died suddenly of heart failure. He is survived by his widow, one son and two daughters. He was 47.

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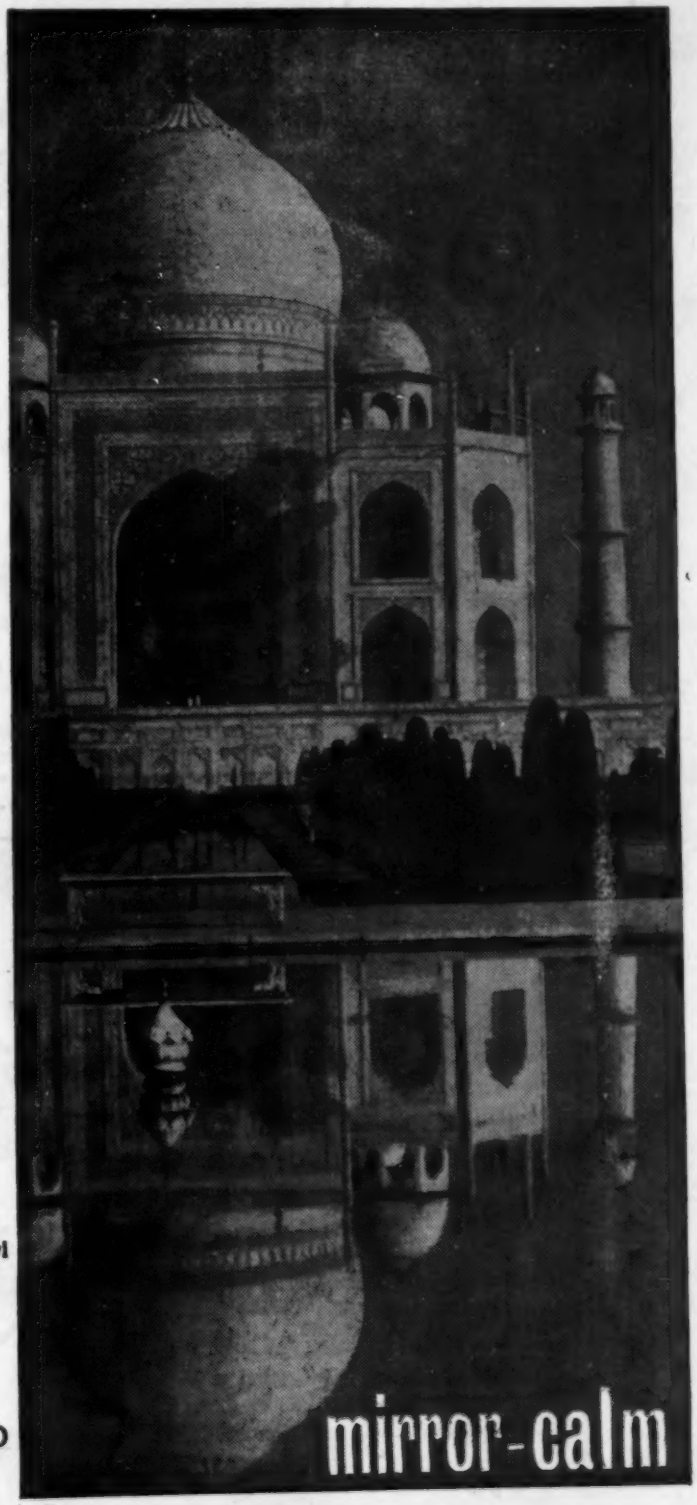

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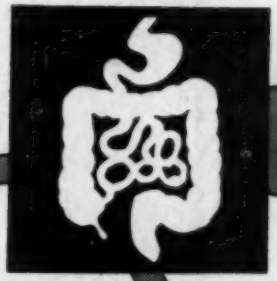

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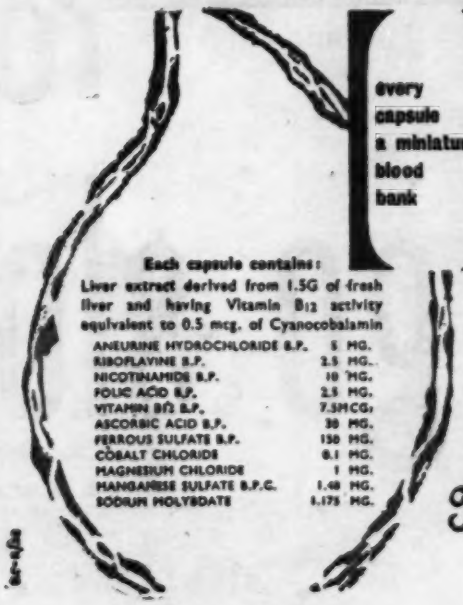

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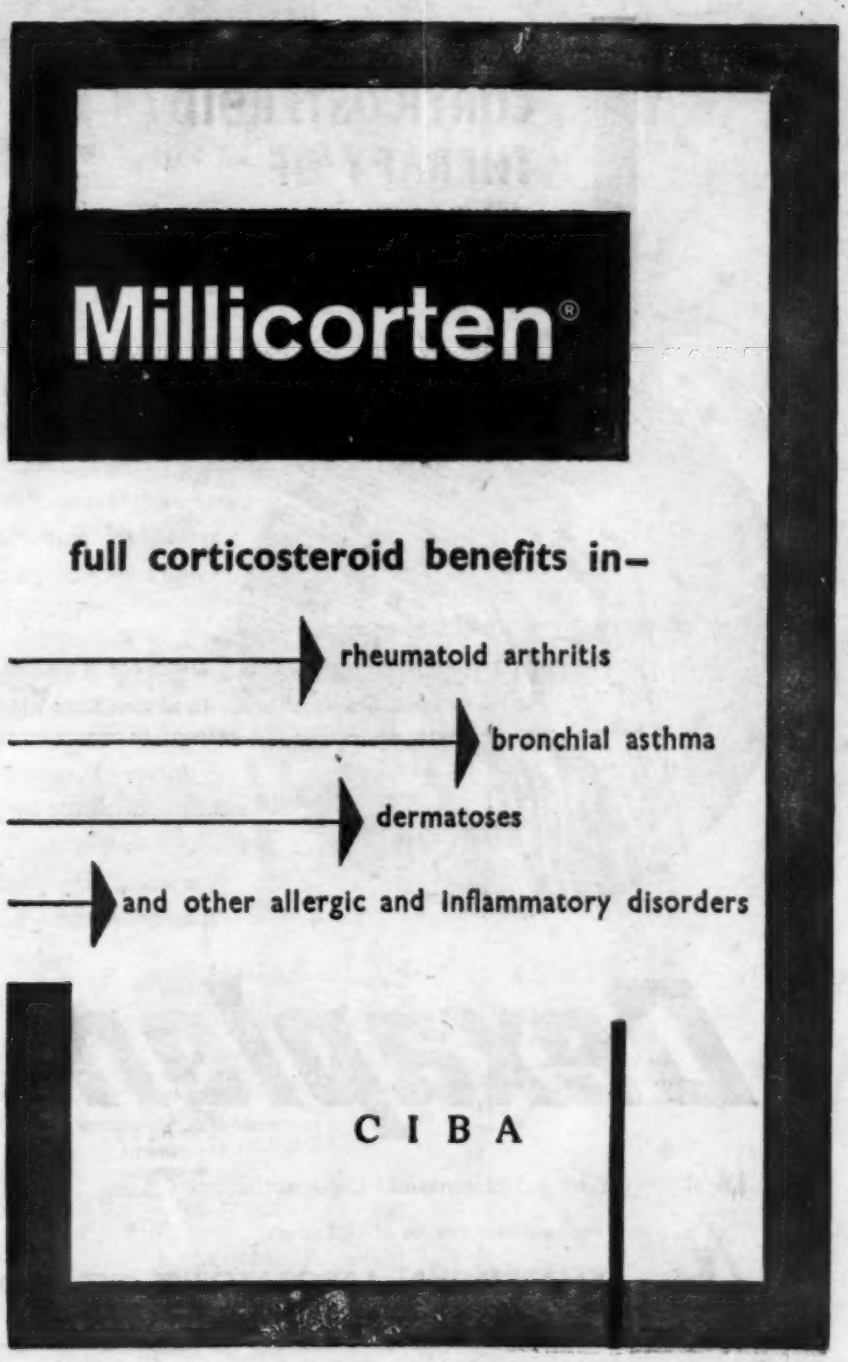
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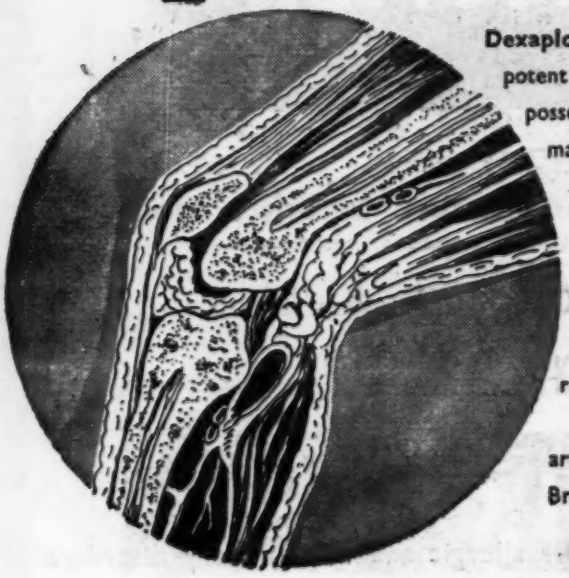

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Dexaplon

brand of dexamethasone

Each tablet contains: Dexamethasone 0.5 mg.

Presentation: Bottles of 10 Tablets.

KHANDELWAL LABORATORIES PVT., LTD.
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in Tuberculosis

SYRUP

OPIZYD

COMPOUND

Highly Palatable

COMPOSITION

Each 28 c. c. (fl. oz.) Contains :

Isonicotinic Acid Hydrazide	500 mg.
Ferrous Gluconate	300 mg.
Calcium Gluconate	250 mg.
Calcium Glycerophosphate	62.5 mg.
Vitamin A	5,000 I.U.
Vitamin D	1,500 I.U.
Vitamin C	100 mg.
Vitamin B1	5 mg.
Vitamin B2	1 mg.
Nicotinamide	20 mg.
Syrup	q. s.

OPIL

ORIENTAL PHARMACEUTICAL INDUSTRIES LTD.

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NO BETTER MILK THAN BREAST MILK
AND NO BETTER SUBSTITUTE THAN

LACTODEX

A HUMANIZED AND HOMOGENIZED

MILK - MALTOSE - DEXTRIN COMPOUND

- Contains protein & carbohydrate in the same proportions as breast milk
- Low in fat
- Easily digested & completely assimilated
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PLEASANT IN TASTE
MAKES AN INVITING BEVERAGE FOR ADULT

Tins of 0.45 Kg. (1 lb.)

Particulars from : RAPTAKOS, BRETT & CO., PRIVATE LTD., WORLI, BOMBAY

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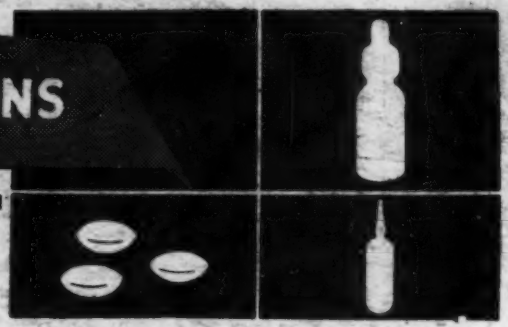
Essential for growth and maintenance

MULTIVITAMINS



	TABLET	DROPS	INJECTION
VITAMINS —	12	11	10
MINERALS—	6		

for all ages and conditions

PANVIT B.I.

Tablet · Drops · Injection

BENGAL IMMUNITY CO., LTD. Calcutta-13

B.I. B-COMPLEX

each cc. contains:-

Vitamin B_1 (Thiamine Hydrochloride)	25 mg.
Vitamin B_2 (Riboflavin)	1 mg.
Vitamin B_6 (Pyridoxin Hydrochloride)	3 mg.
Nicotinamide	50 mg.
Panthenol (d-pantothenyl alcohol)	4 mg.
Choline Dihydrogen Citrate	25 mg.
Benzyl alcohol as preservative	1·5%

1 C.C. AMPOULES
BOXES OF 6, 12 & 30.
10 C.C. RUBBER CAPPED BOTTLES.

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4 OZ., 6 OZ. & 16 OZ. BOTTLES

each fluid ounce contains:-

Vitamin B_1 (Thiamine mononitrate)	25 mg.
Vitamin B_2 (Riboflavin)	6 mg.
Vitamin B_6 (Pyridoxin Hydrochloride)	8 mg.
Nicotinamide	80 mg.
Panthenol (d-pantothenyl alcohol)	20 mg.
Choline Dihydrogen Citrate	500 mg.
Vitamin B_{12} (cyanocobalamin)	12 mcg.
Alcohol by volume in a syrup base	8%

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